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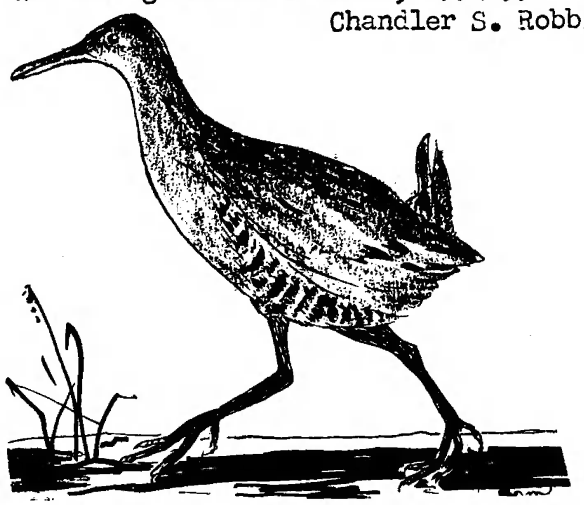

SUMMARY OF WOODCOCK, SNIPE AND RAIL INVESTIGATIONS FOR 1955

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U. S. Fish and Wildlife Service, Washington, D. C.

American Woodcock, Wilson's Snipe and the various North American species of rails are among the migratory birds classified as "game birds" under the provisions of the Migratory Bird Treaty Act and thus are of special concern from the standpoint of their conservation and management. The U. S. Fish and Wildlife Service is the agency charged with the responsibility for management of these migratory birds in the United States, and the Canadian Wildlife Service performs a similar function in Canada. To aid them in this management these agencies conduct research and encourage investigations by others designed to obtain pertinent facts about these birds. Through this publication it is hoped to show the sort of information which is needed and the progress being made in getting it. Each year persons known to be actively engaged in this field are encouraged to contribute reports for this publication so that the information obtained can be disseminated promptly and so aid and act as a stimulus to others working on these or related topics. The development of inventory methods for determining changes in populations of migratory birds on a large scale is extremely complicated. It needs accurate information on many facets of behavior and ecology of the species involved. It, therefore, requires the cooperative approach by many investigators and observers who are particularly qualified or so situated that they can attack these problems effectively. By this cooperative approach it is hoped that little by little we will be able to work out and bring together the facts that will make possible more reliable inventory methods and other requirements for management of migratory game birds on both local and continental levels.

Investigations of woodcock habitats and behavior pertinent to the problem of detecting and appraising changes in populations of this species have been active during the year, and it is believed that most of the more significant work is summarized in the ensuing articles. Special efforts have been made at the Maine and Massachusetts Cooperative Wildlife Research Units, at Louisiana State University and by the Pennsylvania Game Commission, to learn more about the exact habitat requirements of woodcock during specific phases of its annual cycle. These studies are very significant at this stage of our progress in population research as we are searching for a key to the measurement of environmental changes which would modify the figures obtained from population counts. An important question now is: Will we be able to analyze and interpret this information so that favorable woodcock breeding or wintering habitats can be distinguished quickly from unfavorable habitats? What quickly discernible indicators could be used to distinguish different levels of suitability of habitat? Could some rule-of-thumb be devised for quick recognition of these habitat classes

by roadside survey? If this can be done we may be on the way to a method of annual evaluation of changes in amounts of available breeding and wintering habitat which, taken together with the singing ground and wintering ground indexes may give us a fairly accurate indication of what is happening to the over-all woodcock population.

The results of the cooperative study to develop a breeding ground index of woodcock abundance are submitted again this year as the only basis we have at present for judging the status of this species. It is realized by all who have had close contact with this study that these data should not be taken at their face value in judging fluctuations in populations. We have not tested this method sufficiently yet to have complete confidence in its value as an index. Furthermore, as previously pointed out it is probably at best an index of changes in populations in the particular areas of habitat sampled and may not reflect changes that have taken place in the total amount of suitable habitat available to breeding woodcock.

We have broken down the data into two groups--singing grounds east of the Appalachians and those west of those mountains. This is done in an arbitrary manner merely as an experiment to see if there are any marked differences in these two breeding areas, not because they represent discreet populations which remain entirely separate. In fact we know from the little available banding data that there is a big overlap in winter, particularly in the lower Mississippi Valley, which appears to be the principal wintering area for this species. It is noted in Table 1 that a decline of 20% was recorded in woodcock per stop per trip east of the Appalachian Mountains as compared with last year. It is of interest that these same routes last year showed practically no change from the year before. Mendall, in his report beyond, mentions indication of definite deterioration of habitat on some of the Massachusetts routes, but does not believe this to be general. West of the mountains this year we note a 25% decrease. This is almost counterbalanced by the 22% increase recorded last year in the same area, indicating that this years decrease is not the result of a gradual average decline in amount or suitability of the habitats covered by the routes.

In view of the above data and in default of any information that would suggest a radical over-all decrease in suitable woodcock breeding habitat we may be led to conclude that the woodcock population is not undergoing a sustained decline.

The data herein summarized was gathered as in the past by numerous individuals, and sponsored by the respective state game departments. It has been summarized regionally by Victor Solman for Canada, Howard L. Mendall for the Northeastern States, P. F. English for the Central Eastern States and John W. Aldrich for the Central Northern States. Bruce Wright in New Brunswick, Lytle H. Blankenship in Michigan, Stephen A. Liscinsky in Pennsylvania, and William Sheldon in Massachusetts have

Table 1.--SUMMARY OF WOODCOCK SINGING GROUND COUNTS BY STATES EAST OF THE APPALACHIANS

State	Year	Number of routes	Total stops all trips	Total birds all trips	Average birds per stop
New Brunswick*	1955	10	140	165	1.179
Nova Scotia*	1955	3	50	44	.880
Prince Edward Id.*	1955	4	34	26	.765
Maine	1954	59	1325	1169	.882
	1955	123	670	495	.739
New Hampshire	1954	1	22	15	.682
	1955	1	12	9	.750
Vermont	1954	9	180	194	1.077
	1955	16	75	66	.880
Massachusetts	1954	5	200	197	.985
	1955	5	147	128	.871
Connecticut	1954	13	249	127	.510
	1955	15	234	99	.423
New York	1954	13	240	251	1.046
	1955	22	249	205	.823
New Jersey	1954	4	96	52	.542
	1955	4	108	45	.417
Pennsylvania	1954	25	684	511	.747
	1955	30	790	436	.552
Delaware	1954	2	54	32	.593
	1955	2	63	26	.413
Maryland**	1954	1	15	11	.733
North Carolina	1954	7	191	31	.162
	1955	9	155	77	.497
GRAND TOTAL***	1954	138	3241	2579	.794
	1955	227	2503	1586	.634
Difference					-.160
Change					20%

* Comparative data lacking for 1954

** Comparative data lacking for 1955

*** New Brunswick, Nova Scotia, Prince Edward Island and Maryland excluded from grand totals because comparable data not available for both years.

helped greatly in organizing the counts and conducting experimental work on this method in their respective areas.

Counts of wintering woodcock in west central Louisiana made with the help of bird dogs by Vincent Reid and Phil Goodrum in the winter of 1954-1955, reported beyond, showed a 42% increase over the previous winter. This change, as in all changes in the past, showed good correlation with amount of rainfall--the number of woodcock flushed per hour increases with increased precipitation during the period of study. For this reason the counts are not indicative of over-all population changes and will not be until other similar counts are made which cover both upland and lowland habitats simultaneously, and over a fair sample of the wintering range of this species. In this connection data presented by Glasgow in his paper, which appears beyond, is of interest as it was for bottomland habitats in Louisiana as compared with the upland habitats of Reid and Goodrum. In the last two winters the bottomland habitats showed opposite trends in woodcock abundance from the uplands. However, this inverse relationship did not hold for the only other winter for which comparable data were available.

Table 2.--SUMMARY OF WOODCOCK SINGING GROUND COUNTS BY STATES WEST OF THE APPALACHIANS

State	Year	Number of routes	Total stops all trips	Total birds all trips	Average birds per stop
West Virginia	1954	9	223	152	.681
	1955	9	229	104	.454
Kentucky	1954	3	72	27	.375
	1955	6	135	45	.333
Ohio	1954	8	190	229	1.205
	1955	10	199	259	1.302
Michigan	1954	36	944	1000	1.059
	1955	52	889	799	.899
Wisconsin	1954	1	39	25	.641
	1955	5	62	35	.565
Minnesota	1954	3	74	32	.432
	1955	8	130	34	.262
Ontario*	1955	4	176	46	.261
Quebec*	1955	5	51	13	.255
GRAND TOTAL**	1954	60	1542	1465	.950
	1955	99	1871	1335	.714
Difference					-.236
Change					25%

* Comparative data lacking for 1954

** Ontario and Quebec excluded from grand total because comparable data not available for both years.

Bruce S. Wright of the Wildlife Management Institute (in lit.) is continuing study of midsummer habitat and banding of juvenal woodcock on their breeding grounds in New Brunswick by use of a bird dog. Up to the present 185 woodcock have been banded on his area.

Efforts to get an adequate number of woodcock banded received an important assist by the adaptation of the "shore bird trap" with lead fences for capturing these "upland shore birds" (see Liscinsky, S. A. and Bailey, W. J. Jr., Journ. Wildlife Man. 19(3):405-408, 1955). Thus another use has been found for this versatile trap originally designed by Low (Bird Banding, 6:16-22, 1935) and more recently used very effectively for Clapper Rails by Stewart (Trans. 16th N. A. Wildlife Conf., 421-430, 1951).

Research on a method of obtaining an index to Wilson's Snipe abundance on the wintering grounds was continued by Robbins and described in his paper beyond. There were two innovations in his approach to this problem. He made a random selection of new routes and compared results with those obtained on routes selected by other methods. He also reported interesting attempts to count snipe from low-flying aircraft along definite flight lines.

Word from Leslie Tuck of the Canadian Wildlife Service in Newfoundland indicates that he is making progress with analysis of the "winnowing" count index for breeding ground estimation of snipe abundance, and that he is experimenting with luring snipe into mist nets for banding by use of sound recordings. It is hoped that this pioneering work will be continued to even a greater extent in 1956 and that some of the results can be reported soon.

There is a practical value to management of migratory game birds if geographic variations occur which makes possible the separation of examples of different breeding populations that may be examined in hunters' bags. Although less exact than information obtained from banded birds, it at least gives a general idea of the regions where hunted populations breed and the relative proportions of these populations which are killed. With this in view the writer is studying geographic variation in migratory game birds. Preliminary results of examination of the Common Snipe, Capella gallinago in the National collections, together with many borrowed from museums in North America and Europe, indicate the extent of geographic variation, most of which has been adequately described in the literature.

Old World specimens of the common snipe in general differ from New World populations, which we call Wilson's Snipe, primarily in having narrower black bars on the long axillary feathers under the wings. The distinction in this character is the only one which would separate all New World from all Old World populations. Within the Eurasian populations there is a variation from the moderately pale coloration which

persists throughout most of the vast breeding area of that land mass, to the palest of all populations in eastern Siberia. On the Faeroe Islands north of the British Isles a reddish brown variant is the average type. In northern North America the darkest and most blackish populations of the entire species prevail from Newfoundland to Alaska. Even in western Alaska directly across Bering Strait from the pale Siberian population, the snipe, although slightly paler than those farther east, are dark and have the broad black bands on the axillars characteristic of American birds.

A variation which appears not to have been reported hitherto is that characteristic of the breeding birds of the arid western sections of the United States and southwestern Canada. Representatives of this population are as pale as the average Eurasian specimen and can be distinguished from the main Old World population only by the broad black barring of the axillars. In this latter respect they are like other New World representatives. Compared with snipe from northern Canada they are distinctly paler and more buffy.

Work is continuing on analysis and delineation of breeding areas of these variant types. Whether this can be done precisely enough to be of material value in identifying breeding populations represented by migrant birds in hunters' bags remains to be seen.

Observations of rails this past year seem to have been largely connected with the effects of hurricanes and attendant high tides on the reproduction of Clapper Rails on the Atlantic coast. (See MacNamara, L. G., New Jersey Outdoors, 6(3):4-7, Sept. 1955.).

Allen G. Smith (in lit.) was unable to repeat his interesting population studies of the Sora on the scale of former years which have been reported in this publication. Checks made on one area in Alberta, indicated a further decline from 27.5 rails per square mile in 1954 to 13 per square mile in 1955, even though the number of ponds increased from 54 to 57 per square mile in the same area during this period. It is hoped this interesting study can be continued on a larger scale in future years.

Exceedingly important investigations of woodcock banding techniques are being conducted by William Sheldon and his students at the Massachusetts Cooperative Wildlife Research Unit. His recent findings that woodcock netted at their summer crepuscular concentration areas are probably mostly the same birds that breed in the general region is of great importance to the future of breeding ground banding. It means that representatives of the breeding population can be banded in much greater numbers than in the past. Also it means that females and young of the year can be banded in addition to adult males which comprise most of the sample taken by the singing ground method of trapping.

A METHOD OF MEASURING WINTERING WOODCOCK POPULATIONS ON NOCTURNAL FEEDING SITES IN LOUISIANA[1]

Leslie L. Glasgow

Louisiana State University

For the past six years an ecological investigation of woodcock has been conducted on the wintering grounds in the vicinity of Baton Rouge, Louisiana, by the writer and Game Management students at Louisiana State University. One phase of the study has resulted in the banding of more than 4,000 woodcock and the gathering of data on woodcock abundance. The data concerning woodcock abundance are presented in Table 1.

Table 1.--Total Woodcock Observed Per Season

	1951-52	1952-53[2]	1953-54	1954-55
November				
Total birds	0	-	59	2
Total man hours	1.00	-	24.00	0.50
Birds/man hour	0	-	2.46	4.00
December				
Total birds	1337	910	11.85	271
Total man hours	217.00	172.00	175.25	37.75
Birds/man hour	6.16	5.29	6.76	7.18
January				
Total birds	1121	562	706	689
Total man hours	278.50	105.50	85.75	134.75
Birds/man hour	4.03	5.32	8.23	5.11
February				
Total birds	214	9	-	664
Total man hours	67.50	17.50	-	126.50
Birds/man hour	3.17	.51	-	5.24
Season's Total				
Total birds	2672	1481	1950	1626
Total man hours	564.00	295.00	285.00	299.25
Birds/man hour	4.73	5.02	6.84	5.43

Woodcock fly at dusk to nocturnal feeding sites such as in cane, corn, cotton, pasture or fallow fields and remain there until the following dawn, at which time they return to brushy daytime cover. Since the eyes of woodcock reflect a light that is directed at them, it is possible to count the birds with the aid of a night hunter's headlight.

For each nighttime banding trip to the nocturnal feeding sites records were kept of the number of men per party, total time in field, total number of woodcock observed, weather conditions, moisture condition of soil and vegetation, type of cover in field, moon phase, and other ecological conditions.

1. Part of Louisiana State University Agricultural Experiment Station Project 609.
2. From Louisiana Wild Life and Fisheries Commission.

Factors Affecting Number of Birds Observed

A great many complicating factors as discussed in following paragraphs influence the number of birds which use a field as well as the ease of finding them, among which are the following: (1) time of season, (2) experience of personnel, (3) equipment, (4) weather conditions and field moisture, (5) moon phase, (6) time of night in field, (7) frequency of visits to field, (8) relationship of location of feeding field to daytime habitat, and (9) agricultural practices and natural succession.

1. Time of season.--Migratory woodcock begin to arrive in Louisiana in late October; the number increases throughout November, and by December 15 the maximum number is reached. The population remains somewhat steady until Late January or early February. With mild early springs, woodcock may leave the last week of January, but with prolonged cold weather they may remain as late as the third week of February. Counts made before December 15 and after February 1 showed great fluctuations in numbers.

2. Experience of personnel.--Some students were quite adept at seeing woodcock eyes, while others had great difficulty in locating them; consequently the latter walked past many woodcock without seeing them. Students who possessed the fortitude to remain in the field under adverse weather conditions saw more birds than those who went out only during fair weather. Tall students sighted more birds in fields with relatively dense cover than did shorter ones, while those who tired easily saw fewer woodcock than those with greater stamina. In calculating man hours in the field, the time of all students was included regardless of performance.

3. Equipment.--There is a great variation in the beam of light cast by night hunters' headlights. Although the type of beam preferred by a hunter was a personal matter, a medium-sized spot was better than a large or small one. The intensity of the beam from a six-volt light that made a large spot was too diffuse, thereby limiting the distance at which eyes of woodcock were seen. Many lights could not be focused properly. Exhausted batteries failed to produce a bright beam. The correct size of spot and intensity of beam were essential to the successful location of birds.

4. Weather conditions and field moisture.--Weather played a very important role in the activity of the birds as well as in the success of the hunter. On rainy days more birds utilized the nocturnal feeding sites than on dry days. Since wet vegetation was generally darker than dry vegetation, it provided a background against which eyes were easily located. Short droughts caused earthworms to go deeper in the soil with consequent desertion of fields by woodcock. At the same time, there was often a marked increase in the number of woodcock in areas with a plentiful moisture supply. During heavy rains or snows, birds were difficult to see. High humidity was usually associated with large numbers of birds at nocturnal feeding sites. Moderate to slightly warm temperatures resulted in greater numbers of birds in fields than either cold or very warm temperatures. Few birds appeared in fields on nights with heavy

frosts. On windy evenings many birds which went to the fields remained only a few seconds before flying away. Bright, sunny days were nearly always followed by evenings on which few birds were found in the fields. Fog reduced visibility to the point where only birds within a few feet of the hunter could be seen. Of all factors influencing the activities of the birds and the success of the hunter, weather had the greatest effect.

5. Moon phase.--There was an inverse relationship between the intensity of illumination from the moon and the number of woodcock which appeared in the nighttime feeding fields. The maximum number was found with no moon, and the minimum number with a full moon. The lighter the night, the more dense the cover sought by woodcock. A similar relationship existed between a clear sky with bright stars but no moon. Since woodcock feed in more open areas on dark nights than on light ones, they were easiest to locate when the moon was down, the field vegetation wet and the stars masked by a heavy layer of clouds.

6. Time of night in field.--Woodcock activity on the nocturnal feeding sites influenced the ease with which birds were sighted. They arrived at the feeding sites just before darkness and fed until about 10:30 p. m., at which time many of them moved into clumps of vegetation and remained inactive until about 3:00 a. m. when they resumed feeding. There was apparently a direct relationship between activity of the bird and eye reflection. Because of the more brilliant eye reflection or perhaps because of the larger pupil size woodcock were easier to locate when their activities were at a peak.

7. Frequency of visits to field.--Frequency of visits influenced the number of birds which used a field. It was believed that because of the small percentage of repeats (5-10%) the disturbance which resulted from banding caused woodcock to desert their feeding fields. Their numbers decreased sharply when fields were visited two or more times per week. When fewer trips were made to each field each season, it was possible to be more selective of nights. Obviously going to fields only on nights that were known to be conducive to woodcock feeding resulted in a higher average number of woodcock being observed per man hour. Visits to fields by illegal night hunters resulted in a drastic reduction in number of birds in a field.

8. Relationship of location of feeding field to daytime habitat.--Although the relationship between the location of nocturnal feeding sites and daytime cover was not thoroughly investigated, it is believed that it had an important bearing on the number of birds using a field. Those fields which were utilized intensively either adjoined or were surrounded by large blocks of swampland.

9. Agricultural practices and natural succession.--Woodcock preferred feeding sites which had cover about knee high or higher that was interspersed with small areas on which the grass was clipped very short

or bare ground was exposed. Cover may be too dense or too sparse. Agricultural practices such as grazing, mowing, burning, draining and manner of harvesting crops altered the type and condition of cover. If the cover were too dense, opening it up was beneficial; if it were in good condition or slightly sparse, any thinning effect was detrimental.

Changes due to natural succession were often very rapid. Some fields which contained ideal cover one winter were not suitable the next winter.

Any deviation from the optimum cover was apt to result in a decrease in the number of birds using a field.

Discussion

The two factors which cause great variations in November population figures as shown in Table 1 are first, drought which is common in many years, and second, normally the population has not yet reached a peak by the end of the month.

In 1954 a mild period which began about the middle of January extended into mid-February. As a result, woodcock began their northward migration early and were very scarce on the study areas by the latter part of January. In 1955 a cold wave swept into Louisiana in late January and remained until the third week of February. Consequently spring migration was delayed with an unusual number of birds being present in the study areas in February.

The December 1953 population was influenced by the prolonged drought which reduced the number of birds found on the study areas, while the high number observed per man hour in December 1954 was attributed to the fact that more selectivity was used in determining which nights to hunt.

January populations are generally rather stable. The high figure of 8.23 birds per man hour reported for 1954 was due to selectivity of nights plus the use of only expert help.

Recommendations

It is believed that a standardized procedure of checking woodcock on their nocturnal feeding sites would result in the obtaining of figures which would serve as a reliable index to the population of woodcock wintering in the hardwood swamps surrounding Baton Rouge. The following recommendations are suggested as guides in making such a check:

1. Choose fields with good cover which have been used by woodcock in previous years.

2. Check fields at least three or more times at weekly intervals during wet-cloudy periods during the dark of the moon between December 15 and January 25.

3. Use the same experienced personnel each year.

WINTERING WOODCOCK POPULATIONS IN WEST-CENTRAL LOUISIANA, 1954-55

Vincent H. Reid and Phil Goodrum

U. S. Fish and Wildlife Service
Alexandria, Louisiana

Wintering woodcock inventory work was conducted for the sixth season on longleaf pine lands of Vernon, Natchitoches and Rapides Parishes, Louisiana, from November 1954 to February 15, 1955.

Method

As in the past, bird dogs were used; a record was kept of the number of woodcock points made by the dogs and the time spent afield. Usually, two dogs were down at one time.

Inventory Data

Migration.--Dogs were not used in the field much before mid-November. However, some sight records indicate that woodcock were present in the area in September. Bryce Ledford, forest ranger, Evangeline Ranger District, Kisatchie National Forest, flushed one woodcock the first week in September and a second bird during the third week in September. These observations were made on the Evangeline Ranger District about 10 miles southwest of Alexandria, Louisiana, in Rapides Parish.

Table 1 shows the hours per find by weeks for the winter months. The fourth week of November the dogs averaged a point per 0.75 hours of work. Woodcock were found in fair and good numbers through the second week of December. From the third week of December through the first week of January no finds were made. This does not mean that there were no woodcock at all present during this period, but does indicate that they were fewer in number at this time. From the second week of January, until inventory work stopped in mid-February, woodcock were found in fair to good numbers.

The highest weekly count was made during the fourth week of January; the dogs averaged a point per 0.34 hours. In the winter 1953-54, the best average count was made during the third week of January when the dogs averaged a find every 0.5 hours afield.

The best individual count made during the winter 1954-55 was on January 29, 1955; on this day the dogs averaged a point each 0.25 hours on a 7-hour run. The highest count for the preceding season was made on January 13, 1954 when the dogs averaged a point per 0.4 hours afield.

Table 1.--Hours per Woodcock Point by Weeks for the Winters 1949-50 Through 1954-55

Month and Week	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55
			Hours per Point			
Nov. 1st week	-	-	-	4.0	3.0	-
2nd week	-	-	7.5	3.75	5.0	-
3rd week	-	-	-	-	-	0.00
4th week	-	4.7	2.0	2.0	3.3	0.75
5th week	-	6.0	1.5	-	1.6	1.08
Dec. 1st week	0.8	2.6	12.5	13.75	1.9	2.43
2nd week	1.1	1.4	3.5	-	1.6	0.81
3rd week	1.3	2.3	5.6	1.4	14.5	0.00
4th week	0.8	-	4.6	1.8	6.0	0.00
Jan. 1st week	0.6	-	2.6	1.5	0.7	0.00
2nd week	1.4	4.5	2.4	1.5	1.9	2.87
3rd week	0.8	0.5	0.6	-	0.5	0.80
4th week	2.5	1.1	3.0	0.7	1.2	0.34
5th week	1.3	0.6	2.3	0.3	-	-
Feb. 1st week	0.4	1.3	2.7	5.0	2.7	1.85
2nd week	-	-	1.6	1.0	2.5	0.80
3rd week	-	-	-	-	-	1.64

In Table 2 the dates are shown on which high number of finds were made during the last six winters. For the most part, these high counts occurred the last half of January or the first week of February.

Apparently there was a movement of woodcock out of the pine land area between mid-February and mid-March. For in 20 hours of field work with the dogs the last half of March, no woodcock finds were made.

Table 2.--Dates of Highest Woodcock Counts With Bird Dogs, Winters 1949-50 Through 1954-55

Winter	Date Highest Count	Hours per Woodcock
1949-50	February 5, 1950	0.33 (20 minutes)
1950-51	January 15, 1951	0.26 (15 minutes)
1951-52	January 17, 1952	0.25 (15 minutes)
1952-53	January 25, 1953	0.11 (7 minutes)
1953-54	January 13, 1954	0.4 (24 minutes)
1954-55	January 29, 1955	0.25 (15 minutes)

Summary for winter counts.--From November 1954 through February 15, 1955, 123.5 hours were spent in the field with dogs and 110 woodcock finds were made. For this period, the dogs averaged a point for each 1.1 hours. This was an improvement over the 1953-54 count, for in that year the dogs only averaged a point per 1.9 hours in 232 hours of field work.

The counts for the last six seasons are summarized in Table 3. Similar inventory figures, one find per 1.1 hours, were obtained in the winters 1949-50, 1950-51, 1952-53 and 1954-55. About half as many finds were recorded in the winters 1951-52 and 1953-54. In these winters, the dogs averaged only one point for about two hours work.

Table 3.--Summary Woodcock Inventory Figures and Precipitation in Inches, as Recorded at the Leesville, La. Weather Station, Winters 1949-50 Through 1954-55

Winter	Hours dog work	Number of woodcock	Hours per woodcock	Precipitation October through February
1949-50	129.5	117	1.1	32.21
1950-51	166.5	145	1.1	18.80
1951-52	273.0	125	2.1	11.25
1952-53	223.3	172	1.2	22.29
1953-54	232.0	120	1.9	14.83
1954-55	123.5	110	1.1	22.60

Weather

Observations have indicated that fall and winter rains are important in conditioning the piney-woods as favorable woodcock winter range. Sufficient precipitation makes favorable feeding areas along the numerous small streams, branches, baygalls and seepy hillsides. When these areas are dry, they are seldom used by woodcock.

In 1954-55, 22.6 inches of precipitation was recorded from October through February at the Leesville, Louisiana weather station. And, as mentioned above, the dogs averaged a find per 1.1 hours for the season. Precipitation for the same months in 1953-54 totaled 14.83 inches, and the dogs only averaged a point per 1.9 hours.

Precipitation records and the average time per woodcock find for the last six seasons are shown in Table 3. In the seasons 1949-50, 1950-51, 1952-53 and 1954-55, when the dogs averaged about a find per hour, fall and winter precipitation amounted to more than 18 inches. In the seasons 1951-52 and 1953-54, when the dogs averaged a find about every 2 hours, precipitation was below 15 inches.

Summary

1. Bird dogs were used for woodcock inventory work in the longleaf pine section of Vernon, Natchitoches and Rapides Parishes, Louisiana, during the winter 1954-55.

2. Sight records indicated that woodcock were present in the area as early as September.

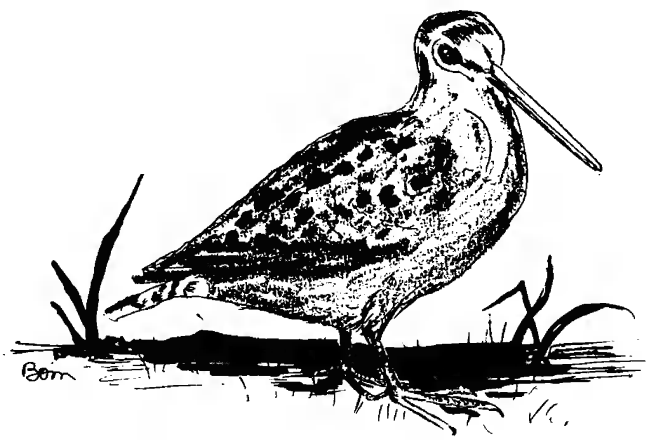
3. The fourth week in November the dogs averaged a point per 0.75 hours. Beginning with the third week of December through the first week of January, no woodcock finds were made. From the second week of January up to mid-February, when inventory work was stopped, woodcock were found in fair to good numbers.

4. The peak week for woodcock finds, with a point per 0.34 hours, was the fourth week of January. The peak individual count was made on January 29, 1955. In a 7-hour round the dogs averaged a point every 0.25 hours.

5. No woodcock finds were made in 20 hours of dog work during the last half of March.

6. The inventory showed more woodcock wintering in the longleaf pine section of west-central Louisiana in 1954-55 than wintered there in 1953-54. In 1954-55 the dogs worked 123.5 hours, made 110 woodcock finds, and averaged a bird per 1.1 hours. In 1953-54 the dogs were down 232 hours, found 120 woodcock, and averaged a point per 1.9 hours.

7. Fall and winter precipitation was greater in 1954-55 (22.6 inches) than in 1953-54 (14.83 inches). Fall and winter rains are important in conditioning the piney-woods woodcock habitat and, seemingly, have a bearing on woodcock numbers.



WOODCOCK SINGING GROUND COUNTS IN CANADA - 1955

V. E. F. Solman

Canadian Wildlife Service, Ottawa, Ont., Canada

Locality	Observer	Number of trips	Total birds all trips	Total stops all trips	Average birds per stop
NEW BRUNSWICK					
Albert Co. Turtle Creek Rd.	G. F. Boyer	2	64	22	2.909
St. John Co. Tilly Rd.	B.C.Carter	2	15	18	.833
York Co. Mazerol Settlement	B.S.Wright	1	9	10	.900
York Co. Charter's Settlement	B.S.Wright	1	9	10	.900
York Co. Kingsley Bridge	B.S.Wright	1	10	10	1.000
York Co. Richibucto Rd.	B.S.Wright	1	24	10	2.400
Westmorland Co. Aulac Rd.	G.F.Boyer	2	2	14	.143
Westmorland Co. Cookville Rd.	G.F.Boyer	2	19	16	1.188
Westmorland Co. Rockport Rd.	G.F.Boyer	2	12	16	.750
Westmorland Co. Jolicure Rd.	G.F.Boyer	1	1	13	.077
NOVA SCOTIA					
Kings Co. Greenfield Davison St.	R.W.Tufts	3	17	19	.895
Kings Co. Melanson Mt.	R.W.Tufts	3	13	14	.929
Kings Co. "Miner Meadow Rd."	R.W.Tufts	2	14	14	1.000
ONTARIO					
Frontenac Co. Collins Creek Rd.	G.M.Stirrett	1	0	12	0.
Frontenac Co. Holleford	G.M.Stirrett	3	6	36	.167
Frontenac Co. Perth Rd.	G.M.Stirrett	3	11	36	.306
Frontenac Co. Westbrook	G.M.Stirrett	3	6	48	.125

Woodcock Singing Ground Counts in Canada - 1955
Continued

Locality	Observer	Number of trips	Total birds all trips	Total stops all trips	Average birds per stop
ONTARIO (contd.)					
Carleton Co.					
Mer Bleu	V.E.F.Solman	1	2	16	.125
Russell Co.					
Vars	V.E.F.Solman	1	6	8	.750
Carleton Co.					
Highway 15	J.S.Tener	2	15	20	.750
PRINCE EDWARD ISLAND					
Queens Co.	A.M.Johnston				
Avondale Area	J.T.Murrant	1	4	11	.364
Queens Co.	A.M.Johnston				
French Village Area	J.T.Murrant	1	3	7	.429
Kings Co.	A.M.Johnston				
Fortune Area	J.T.Murrant	1	3	7	.429
Prince Co.	A.M.Johnston				
Conway	J.T.Murrant	1	16	9	1.778
QUEBEC					
North of Hull	J.S.Tener				
Chelsea	V.E.F.Solman	2	9	16	.563
Catineau Co.					
Aylmer North	D.A.Munro	3	4	35	.114
TOTALS		46	294	447	.658

WOODCOCK CENSUS STUDIES IN NORTHEASTERN UNITED STATES - 1955

Howard L. Mendall

Maine Cooperative Wildlife Research Unit,
University of Maine

The 1955 woodcock census data for the New England States and New York were compiled by the writer who again served as coordinator for the northeastern region.

The census technique was essentially the same as a year ago. Fewer checks were made on the individual routes this year in line with efforts made to increase the geographical coverage. Statistical analyses had indicated the need for more routes to be covered, fewer times if need be, rather than to have repeated checks on a limited number of areas. Some cooperators were not in a position to expand their coverage and these people made two or three checks on their usual areas. In addition to the fact that increased coverage unquestionably is needed, repeat checks on a given route are very helpful when time permits these. Appreciable variation in census figures was noted on many of those routes which were covered more than once.

A large number of new routes were established this year, especially in Maine, Vermont and New York, and the overall coverage was more than doubled. Game Division personnel of the Maine Department of Inland Fisheries and Game deserve special commendation for their efforts in this respect.

The census results for each area are shown in Table 1. The areas have been grouped by counties with the counties arranged in alphabetical order. The 1954 index figures also are given for comparative purposes on all routes which were censused both years.

Table 2 shows the summarized results by states of all data compiled in 1955. Table 3 gives comparative data for 1954 and 1955 on the areas which were covered in both years. In this connection it should be pointed out that the 1954 index figures are not exactly the same as were given in last year's report. Since some of the 1954 routes were not run this year, while others were revised somewhat, the index figures have been adjusted to permit direct comparisons.

An examination of data in Table 3 indicates a slight reduction in woodcock populations this year throughout the region. The lone exception occurred in New Hampshire, but the data are too few there to be of significance. To what extent these figures actually reflect a population decline is uncertain at this time. Massachusetts workers feel the reduction on the important Prescott Peninsula route is due more to changing, less favorable habitat conditions than to woodcock losses. Undoubtedly this applies in other areas as well. On the other hand, it is to be expected that on some of the census routes, habitat is becoming more favorable. Furthermore, the lowered population trend was general throughout

the region. In Maine all sections of the State showed a decline except in Kennebec and Washington Counties, where no appreciable change occurred. Data from both Vermont and Connecticut indicated fewer birds throughout most sections. Of areas covered in Massachusetts the only increase was in Essex County. In New York, Chautauqua was the only county that did not show a decline.

In the opinion of the writer, the current data do not indicate any occasion for alarm as to the status of woodcock at this time. For the 3 years prior to 1955, breeding populations in the region have been quite constant at a reasonably high level. Conditions for nesting this year, at least in Maine, have been ideal and good seasonal productivity may be expected. Nevertheless, because a probable loss in excess of 15 percent in breeding birds is indicated for the region, next year's census studies will take on added importance. It is to be hoped that further expansion in geographical coverage can be made.

Census Organization

Within the several states the 1955 census studies were organized by the following:

Maine: by W. R. DeGarmo, Maine Department of Inland Fisheries and Game, and by the writer. Special assistance in eastern Maine was given by John Dudley, Louis Beckett, and by personnel of the Moosehorn National Wildlife Refuge.

New Hampshire: by Fred Scott, New Hampshire Fish and Game Department.

Vermont: by Roger Seamans, Vermont Fish and Game Service, with Ralph Minns, U. S. Fish and Wildlife Service, handling the Highgate and Swanton areas.

Massachusetts: by William Sheldon, Massachusetts Cooperative Wildlife Research Unit, assisted by Russell Norris, U. S. Fish and Wildlife Service, on the Newburyport area.

Connecticut: by Ruth Billard, Connecticut Board of Fisheries and Game.

New York: by Ralph Smith, New York Conservation Department.

In conclusion, the writer would like to express his thanks to all the individual census takers listed in Table 1. The present coverage is the best ever obtained and was possible only through the interest of so many people. Appreciation is also expressed for the promptness in submitting the data sheets. This cooperation greatly facilitated the coordinator's task in compiling the data.

Table 1.--Woodcock Census Studies in the Northeast - 1955

State	Census Route	County	1954	1955			Observer
			Av. No. birds per stop per trip	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip	
Me.	Leeds	Androscoggin	0.6	9	2	0.2	N. Fellows
Me.	Androscoggin R.	Androscoggin	-	20	5	0.3	N. Fellows
Me.	So. Auburn	Androscoggin	-	10	6	0.6	N. Fellows
Me.	Haynesville	Aroostook	-	16	26	1.6	F. Dunn
Me.	Bancroft	Aroostook	-	8	5	0.6	F. Dunn
Me.	Crystal Sta.	Aroostook	-	5	4	0.8	F. Dunn
Me.	Moro	Aroostook	0.8	8	7	0.9	F. Dunn
Me.	Pleasant Pond	Aroostook	0.4	9	1	0.1	F. Dunn
Me.	Masardis	Aroostook	-	6	4	0.7	H. Carson
Me.	Oxbow	Aroostook	0.9	13	7	0.5	H. Carson
Me.	Wade	Aroostook	0.4	9	1	0.1	H. Carson
Me.	Ashland	Aroostook	0.8	11	7	0.6	H. Carson
Me.	So. Ashland	Aroostook	-	7	2	0.3	H. Carson
Me.	No. Quimby Rd.	Aroostook	-	9	3	0.3	H. Carson
Me.	E. Jemtland Rd.	Aroostook	-	6	4	0.7	H. Carson
Me.	Hodgdon	Aroostook	0.7	24	14	0.6	H. Mendall
Me.	Kingman	Aroostook - Penobscot	-	10	8	0.8	F. Dunn
Me.	Highland Lake	Cumberland	0.9	8	4	0.5	N. Fellows
Me.	Webber Rd.	Cumberland	-	16	23	1.4	E. Baker
Me.	Flying Point	Cumberland	-	9	7	0.8	E. Baker
Me.	Durham Rd.	Cumberland	-	20	24	1.2	E. Baker
Me.	Langtown	Franklin	-	9	2	0.2	H. Spencer
Me.	Salem	Franklin	1.0	24	17	0.7	H. Spencer
Me.	Coplin	Franklin	-	27	22	0.8	H. Spencer
Me.	Amherst	Hancock	1.0	10	3	0.3	J. Peppard
Me.	Great Marsh Rd.	Hancock	-	7	7	1.0	R. Parks
Me.	Sullivan	Hancock	-	12	10	0.8	R. Parks
Me.	Eastbrook #1	Hancock	-	9	4	0.4	R. Parks
Me.	Eastbrook #2	Hancock	-	9	8	0.9	R. Parks
Me.	Toddy Pond #1	Hancock	0.8	20	10	0.5	R. Parks
Me.	Toddy Pond #2	Hancock	-	7	10	1.4	R. Parks
Me.	Pattens Pond	Hancock	-	8	3	0.4	R. Parks
Me.	Lamoine	Hancock	1.2	9	7	0.8	R. Parks
Me.	Bayside	Hancock	1.1	10	10	1.0	R. Parks
Me.	Bar Harbor	Hancock	0.9	14	10	0.7	D. McPheters
Me.	Mt. Desert	Hancock	-	6	5	0.8	D. McPheters
Me.	Gardiner	Kennebec	0.8	11	9	0.8	W. Harris
Me.	Sidney	Kennebec	-	11	5	0.5	J. Maasen
Me.	Vassalboro	Kennebec	-	14	4	0.3	J. Maasen
Me.	Belgrade,R.135	Kennebec	-	13	16	1.2	W. DeGarmo
Me.	Readfield	Kennebec	1.0	20	19	1.0	W. DeGarmo
Me.	Rome	Kennebec	-	11	4	0.3	W. DeGarmo
Me.	Belgrade Stream	Kennebec	0.9	11	10	0.9	W. DeGarmo

Table 1.--Woodcock Census Studies in the Northeast - 1955--Continued

State	Census Route	County	1954	1955			Observer
			Av. No. birds per stop per trip	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip	
Me.	Readfield Cor.	Kennebec	-	11	4	0.3	W. DeGarmo
Me.	St. George	Knox	0.8	10	5	0.5	J. Maasen
Me.	Dresden Mills	Lincoln	2.1	12	22	1.8	E. Baker
Me.	Pleasant Pond	Oxford	-	11	4	0.3	N. Fellows
Me.	Chase Brook	Oxford	-	9	6	0.7	N. Fellows
Me.	Canton Lake	Oxford	-	9	5	0.6	N. Fellows
Me.	E. Buckfield	Oxford	-	9	2	0.2	N. Fellows
Me.	Albany	Oxford	1.4	7	7	1.0	N. Fellows
Me.	Merrill Corner	Oxford	-	8	7	0.9	D. Allison
Me.	Durgintown	Oxford	-	8	8	1.0	D. Allison
Me.	Porter	Oxford	-	16	10	0.6	D. Allison
Me.	E. Denmark	Oxford	-	9	5	0.6	D. Allison
Me.	Greenbush	Penobscot	1.7	10	17	1.7	C. Westfall
Me.	No. Bradford	Penobscot	-	10	10	1.0	M. Smart
Me.	Shin Pond	Penobscot	0.7	10	4	0.4	F. Dunn
Me.	Wadleigh Brook	Penobscot	-	8	10	1.3	F. Dunn
Me.	Chester	Penobscot	0.4	20	7	0.4	G. Aiken
Me.	Kingman	Penobscot	1.7	18	26	1.4	G. Aiken
Me.	Winn	Penobscot	-	16	10	0.6	G. Aiken
Me.	Enfield	Penobscot	1.0	16	13	0.8	G. Aiken
Me.	Kenduskeag	Penobscot	-	12	8	0.7	D. Holmes
Me.	Carmel	Penobscot	-	11	4	0.3	D. Holmes
Me.	Orono	Penobscot	0.3	12	3	0.3	D. Quick
Me.	LaGrange	Penobscot	1.6	13	8	0.6	D. Quick
Me.	Bradford, R.221	Piscataquis	-	10	8	0.8	M. Smart
Me.	Bernard Corner	Piscataquis	-	11	6	0.5	M. Smart
Me.	Brownville	Piscataquis	-	10	6	0.6	M. Smart
Me.	Medford	Piscataquis	-	10	7	0.6	M. Smart
Me.	Williamsburg	Piscataquis	0.6	9	4	0.4	M. Smart
Me.	Maple Road	Piscataquis	-	12	9	0.8	M. Smart
Me.	Atkinson	Piscataquis	0.8	9	6	0.7	M. Smart
Me.	Atkinson Corner	Piscataquis	-	10	5	0.5	M. Smart
Me.	Abbot	Piscataquis	-	9	11	1.2	J. Hunt
Me.	Blanchard	Piscataquis	-	7	4	0.6	J. Hunt
Me.	Sangerville	Piscataquis	-	8	5	0.6	D. Holmes
Me.	Brann's Mills	Piscataquis	-	8	3	0.4	D. Holmes
Me.	Trout Brook	Piscataquis	1.1	6	4	0.7	M. Scott
Me.	T4 R10	Piscataquis	1.9	15	16	1.1	H. Taylor
Me.	Topsham	Sagadahoc	1.1	12	3	0.3	E. Baker
Me.	Bowdoinham	Sagadahoc	1.2	14	9	0.6	E. Baker
Me.	Georgetown	Sagadahoc	-	10	4	0.4	J. Maasen
Me.	Skowhegan	Somerset	-	9	7	0.8	J. Hunt
Me.	Moose River	Somerset	-	7	6	0.9	J. Hunt
Me.	Anson	Somerset	-	9	4	0.4	J. Hunt
Me.	Lake Embden	Somerset	-	10	8	0.8	J. Hunt

Table 1.--Woodcock Census Studies in the Northeast - 1955--Continued

State	Census Route	County	1954	1955			Observer
			Av. No. birds per stop per trip	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip	
Me.	Concord	Somerset	0.6	12	6	0.5	J. Hunt
Me.	Jackman	Somerset	0.8	11	8	0.7	J. Hunt
Me.	Madison	Somerset	0.6	12	8	0.7	J. Hunt
Me.	Detroit	Somerset	-	11	4	0.3	D. Holmes
Me.	Montville	Waldo	0.7	12	7	0.6	J. Maasen
Me.	Searsmont	Waldo	-	8	6	0.8	M. Maasen
Me.	Winterport	Waldo	-	10	4	0.4	D. Holmes
Me.	Sandy Point	Waldo	0.6	8	7	0.9	D. Holmes
Me.	Calais	Washington	-	18	9	0.5	H. Stanhope
Me.	Charlotte #1	Washington	1.0	14	23	1.6	H. Mendall
Me.	Charlotte #2	Washington	1.2	16	22	1.4	H. Mendall
Me.	Charlotte Sta.	Washington	-	14	10	0.7	H. Mendall
Me.	Meddybemps #1	Washington	1.8	10	11	1.1	H. Mendall
Me.	Meddybemps #2	Washington	0.3	12	6	0.5	H. Mendall
Me.	Baileyville	Washington	-	14	12	0.9	H. Mendall
Me.	Crawford Lake	Washington	-	16	7	0.4	H. Mendall
Me.	Cooper	Washington	0.9	16	14	0.9	H. Mendall
Me.	Alexander	Washington	1.1	12	13	1.1	J. Dudley
Me.	Machias River	Washington	0.7	10	7	0.7	H. Blanchard
Me.	Columbia Falls	Washington	1.0	11	7	0.6	H. Blanchard
Me.	Jacksonville	Washington	0.9	11	10	0.9	H. Blanchard
Me.	East Stream	Washington	-	12	5	0.4	H. Blanchard
Me.	Marion	Washington	-	10	7	0.7	H. Blanchard
Me.	Pembroke	Washington	-	10	4	0.4	H. Blanchard
Me.	Smith Ridge	Washington	-	10	5	0.5	H. Blanchard
Me.	Cutler	Washington	-	10	6	0.6	H. Blanchard
Me.	Crowe Neck	Washington	-	10	3	0.3	H. Blanchard
Me.	Topsfield	Washington	-	9	7	0.8	G. Aiken
Me.	Edmunds #1	Washington	0.5	27	11	0.4	L. Bagley
Me.	Edmunds #2	Washington	0.9	27	23	0.9	A. Davis
Me.	Edmunds #3	Washington	0.5	18	7	0.4	L. Bagley
Me.	No.Parsonsfield	York	-	16	24	1.5	D. Allison
Me.	Maplewood	York	-	16	17	1.1	D. Allison
Me.	Limerick	York	0.6	9	8	0.9	C. Banasiak
Me.	Lyman	York	0.9	9	5	0.6	C. Banasiak
N.H.	Pittsburg	Coos	0.7	12	9	0.8	F. Scott
Vt.	Granville	Addison	0.8	10	4	0.4	H. Colton
Vt.	Lincoln #1	Addison	-	11	10	0.9	R. Fuller
Vt.	Lincoln #2	Addison	-	8	6	0.8	R. Fuller
Vt.	Ripton	Addison	1.8	12	19	1.6	R. Fuller
Vt.	Starksboro	Addison	0.8	10	10	1.0	R. Fuller
Vt.	Hall's Brook	Caledonia	1.3	9	9	1.0	R. Seamans
Vt.	Victory #1	Essex	2.0	9	14	1.6	R. Seamans
Vt.	Victory #2	Essex	-	5	3	0.6	R. Seamans

Table 1.--Woodcock Census Studies in the Northeast - 1955--Continued

State	Census Route	County	1954	1955			Observer
			Av. No. birds per stop per trip	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip	
Vt.	Swanton #1	Franklin	-	9	9	1.0	R. Minns
Vt.	Swanton #2	Franklin	-	16	13	0.8	R. Minns
Vt.	Lake Elmore	Lamoille	-	10	13	1.3	R. Seamans
Vt.	Goshen	Rutland	-	14	8	0.6	H. Colton
Vt.	Shrewsbury	Rutland	1.1	15	7	0.5	H. Colton
Vt.	Pittsford	Rutland	-	12	3	0.3	H. Colton
Vt.	Warren	Washington	-	11	7	0.6	R. Seamans
Vt.	Halifax	Windham	0.3	10	3	0.3	R. Seamans
Mass.	Newburyport	Essex	1.6	7	13	1.9	R. Norris
Mass.	Leverett	Franklin	1.3	8	8	1.0	W. Sheldon
Mass.	Prescott	Worcester	0.9	84	58	0.7	W. Sheldon
Mass.	MDC-Quabbin	Worcester	1.0	32	37	1.2	W. Sheldon
Mass.	Gate 40-Quabbin	Worcester	0.8	16	12	0.8	W. Sheldon
Conn.	Glastonbury	Hartford	0.4	8	4	0.5	M. Beldon
Conn.	Barkhamsted #1	Hartford	-	22	6	0.3	A. Lamson
Conn.	Barkhamsted #2	Hartford	0.5	30	11	0.4	A. Lamson
Conn.	Farmington	Hartford	0.7	18	6	0.3	N. Chapin
Conn.	Litchfield #1	Litchfield	0.6	12	11	0.9	R. Billard
Conn.	Litchfield #2	Litchfield	0.5	24	6	0.3	R. Billard
Conn.	Sandtown Rd.	Litchfield	0.6	18	6	0.3	W. Sondrini
Conn.	Portland #1	Middlesex	0.3	18	11	0.6	T. Bampton
Conn.	Portland #2	Middlesex	0.5	21	7	0.3	M. Arnold
Conn.	No. Branford	New Haven	0.4	18	8	0.4	O. Beckley
Conn.	Guilford	New Haven	0.9	18	14	0.8	O. Beckley
Conn.	Montville	New London	-	6	5	0.8	M. Belden
Conn.	Shenipsit #2	Tolland	0.5	14	2	0.1	R. Billard
Conn.	Shenipsit #3	Tolland	0.2	21	9	0.4	R. Billard
Conn.	Eastford	Windham	0.4	14	4	0.3	R. McDowell
N. Y.	Partridge Run	Albany	1.2	21	16	0.8	C. Brown
N. Y.	Dunbar Hollow	Albany	0.7	30	16	0.5	R. Carl
N. Y.	Delmar	Albany	1.0	20	13	0.7	R. Smith
N. Y.	Bozenkill	Albany	0.3	27	5	0.2	J. Reilly
N. Y.	Hanging Bog	Allegany	0.6	27	5	0.2	D. Hull
N. Y.	Ashville	Chautauqua	0.5	33	27	0.8	R. Willsie
N. Y.	Pharsalia	Chenango	1.4	27	17	0.6	P. Kelsey
N. Y.	Putnam Creek	Essex	-	20	16	0.8	G. Davis
N. Y.	Wilmington	Essex	-	33	31	0.9	R. Mulvey
N. Y.	Lyon Brook	Franklin	2.2	24	43	1.8	G. Chase
N. Y.	Indian Lake	Hamilton	0.9	18	13	0.7	R. Smith
N. Y.	Ives St. Rd.	Jefferson	-	24	18	0.8	F. Morrell
N. Y.	Baldwinsville	Onondaga	2.0	30	44	1.5	M. Alexander
N. Y.	Happy Valley	Oswego	-	18	10	0.6	R. Smith
N. Y.	Buck's Corner	Rensselaer	0.8	10	6	0.6	R. Smith
N. Y.	Reynold's Corner	Saratoga	-	18	11	0.6	W. Buckley

Table 1.--Woodcock Census Studies in the Northeast - 1955--Continued

State	Census Route	County	1954	1955			Observer
			Av. No. birds per stop per trip	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip	
N. Y.	Manorville	Suffolk	-	21	13	0.6	G. Raynor
N. Y.	Dryden	Tomkins	-	22	11	0.5	J. Whalen
N. Y.	Conn. Hill #1	Tomkins	-	10	5	0.5	G. Swanson
N. Y.	Conn. Hill #2	Tomkins	-	20	29	1.5	G. Swanson
N. Y.	Conn. Hill #3	Tomkins	-	9	8	0.9	G. Swanson
N. Y.	Adamsville	Washington	-	27	11	0.4	W. Buckley

Table 2.--1955 Summary by States - All Data

State	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip
Maine	1436	1032	0.72
New Hampshire	12	9	0.75
Vermont	171	138	0.81
Massachusetts	147	128	0.87
Connecticut	262	110	0.42
New York	489	368	0.75
Totals	2517	1785	0.71

Table 3.--Comparative Census Data by States, 1954 and 1955
(Only routes censused during both years)

State	Year	Total stops all trips	Total birds all trips	Av. No. birds per stop per trip
Maine	1954	1325	1169	0.88
	1955	670	495	0.74
New Hampshire	1954	22	15	0.68
	1955	12	9	0.75
Vermont	1954	180	194	1.08
	1955	75	66	0.88
Massachusetts	1954	200	197	0.99
	1955	147	128	0.87
Connecticut	1954	249	127	0.51
	1955	234	99	0.42
New York	1954	240	251	1.05
	1955	249	205	0.82
Totals	1954	2216	1953	0.88
	1955	1387	1002	0.72

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WOODCOCK SINGING GROUND COUNTS FOR THE MIDDLE EASTERN STATES, 1955

P. F. English

Pennsylvania State University

The following agencies and some of their personnel aided in the gathering of these data for 1955:

Board of Game and Fish Commissioners, Dover, Delaware
Game and Inland Fish Commission, Baltimore 2, Maryland
Wildlife Resources Commission, Raleigh, North Carolina
Department of Conservation and Economic Development, Trenton, New Jersey
Department of Natural Resources, Columbus, Ohio
Pennsylvania Game Commission, Harrisburg, Pennsylvania
Pennsylvania State University, Dept. of Zoology, and Pennsylvania Cooperative Wildlife Research Unit, University Park, Pennsylvania
West Virginia Conservation Commission, Charleston, West Virginia
Department of Fish and Wildlife Resources, Frankfort, Kentucky

Table 1.--Woodcock singing ground counts for 1953, 1954 and 1955

State	Census area	County	No. occupied singing grounds			Observers 1955
			1953	1954	1955	
Del.	Petersburg	Kent	4	5	4	E.B.Chamberlain
Del.	Golts	New Castle	8	6	5	Burd McGinnes
Md.	Pocombe River #1	Worcester	8	4	*	
N.C.	New Hope Farm #1	Chatham	10	3	7	Donald J. Hankla
N.C.	Glen Alpine #2	Burke	1	0	1	E.R.Smith, Jr.
N.C.	Southern R.R. Tr. E. #3	Burke	2	2	1	E.R.Smith, Jr.
N.C.	Southern R.R. Tr. W. #3a	Burke	-	-	1**	E.R.Smith, Jr.
N.C.	Highway 70 #4	Burke	1	0	0	E.R.Smith, Jr.
N.C.	Old N. Main St. #5	Henderson	5	3	5	Rex L. Bird
N.C.	Tracy Grove Road #6	Henderson	2	3	4	Rex L. Bird
N.C.	Conoho Farm #7	Martin	-	-	8**	W. A. Goodson
N.C.	Cane Creek #8	Alamance	-	-	1**	Chas. E. Hill
N.J.	Archer Creek #1	Ocean	2	2	2	P. D. McLain
N.J.	Tuckahoe #2	Atlantic	7	6	7	Fred Ferrigno
N.J.	Walpack #3	Sussex	6	5	3	R. A. Spinks
N.J.	Haleyville P.S.Gds. #4	Cumberland	5	4	3	E. G. Bevan
Pa.	Barrens #1	Centre	2	3	6	P.F.&E.M.English
Pa.	Stone Valley #2	Huntingdon	8	11	14	P.F.&E.M.English,Ward & Louise Sharp
Pa.	Bald Eagle #3	Centre and Blair	8	9	9	Wilmer C. Richter
Pa.	Port Matilda #4	Centre	7	14	13	Steve Liscinsky
Pa.	Martha Furnace #5	Centre	8	8	11	R. G. Wingard
Pa.	Julian #6	Centre	5	5	3	R. Wilson
Pa.	Unionville #7	Centre	7	6	3	Rev. Miller

Table 1.--Woodcock singing ground counts for 1953, 1954 and 1955--Con.

State	Census area	County	No. occupied singing grounds 1953	1954	1955	Observers 1955
Pa.	Atkinson Mills #8	Mifflin	6	5	4	J.W.Taylor and C. Kuhn
Pa.	Mifflin #9	Juniata	2	4	3	W. B. Taylor
Pa.	Upper Strasburg #10	Franklin	6	3	3	Glenn L.Bowers
Pa.	New Bloomfield #11	Perry	2	2	2	Harvey Roberts
Pa.	New Germantown #12	Perry	4	3	1	Harvey Roberts
Pa.	Ardara #13	Westmoreland	-	4	3	Joe Liss
Pa.	Neff Mills #14	Huntingdon	-	6	*	
Pa.	Blooming Grove #15	Pike	-	9	7	A.J.Kriefski
Pa.	Linesville #16	Crawford	-	9	1	Ray M.Sickles
Pa.	Pittsfield #17	Warren	-	6	6	Elton Barton
Pa.	Clarendon #18	Warren	-	4	4	Ivan M.Warner
Pa.	Penn Run #19	Indiana	-	4	2	Robert L.Snyder
Pa.	Thornhurst #20	Lackawana	-	13	12	Steve Kish
Pa.	Freeland #21	Luzerne	-	11	8	Steve Laputka
Pa.	Geneva #22	Crawford	-	4	3	Hank Pratt
Pa.	Enlenton #23	Venango	-	4	4	C.L. Decker
Pa.	McKean #24	Erie	-	9	*	
Pa.	Mt. Royal #25	York	-	1	1	E. Lesko
Pa.	Betula #26	McKean	-	12	9	W. H. Shirey
Pa.	Coryville #27	McKean	-	-	3**	K.B.Ogilvie
Pa.	Marvindale #28	McKean	-	-	5**	J.D.Shelander
Pa.	Albion #29	Erie	-	-	3**	Wm. D. Jones
Pa.	Brookville #30	Jefferson	-	-	4**	J.Zarichansky
Pa.	Millport #31	Potter	-	-	8**	Otis Robbins
Pa.	Sharpsville #32	Mercer	-	-	2**	D. A. Carbon
W.Va.	Kumbrabow Forest #1	Randolph	7	3	2	John Gill
W.Va.	Bayard to Henry #2	Grant	9	9	10	David D.Gilpin
W.Va.	Thorny Creek #3	Pocahontas	2	3	3	Hans G. Uhlig
W.Va.	Cranberry Road #4	Pocahontas	-	2	0***	R. W. Bailey
W.Va.	Mt. Tabor Road #5	Raleigh	4	3	1	R.C. Kletzly
W.Va.	Old Town - Igloos #6	Mason	6	6	4	H. and A. Dahl
W.Va.	State Rt. #32, #7	Tucker	2	9	5	James Beach
W.Va.	Routes 19 and 41, #8	Nicholas	-	6	6	K.H. Anderson
Ohio	Austinburg #1	Ashtabula	6	13	13	D.Euverhard and R. Evans
Ohio	Dorset #2	Ashtabula	7	9	5	M.C.Gilfillan
Ohio	Morgan #3	Ashtabula	6	5	1	J.V.& H.E.Thayer
Ohio	Andover #4	Ashtabula	12	12	13	M.D. & M.C. Gilfillan
Ohio	Ashtabula #5	Ashtabula	20	22	18	P.Savage, B.Budd, & P. Evans
Ohio	Twin Lakes #6	Portage	4	2	1	R.W. Dexter & Students
Ohio	Castalia #8	Erie	65	14	22	R. Gettell

Table 1.--Woodcock singing ground counts for 1953, 1954, and 1955--Con.

State	Census area	County	No. occupied singing grounds 1953	1954	1955	Observers 1955
Ohio	Maumee For. #9	Fulton	-	-	18**	R. McElroy
Ohio	Route 229, #10	Delaware	-	-	4**	M.L., M.D. and M.C.Gilfillan
Ohio	Mentor #11	Lake	-	-	2**	J. A. Hague
Ky.	Sand Road #1	Bath	2	1	0	Storner
Ky.	Sloans Crossing #2	Edmonson	-	7	7	Dan M. Russel
Ky.	Millers Val. Road #3	Todd	0	1	0	W.L. Gault
Ky.	Bennettstown Rd. #4	Christian	-	-	11**	Jerry Wunz
Ky.	Ord Comp. Gate #5	Hardin	-	-	2**	Bruna - Jack Rensel
Ky.	Highway 213, #6	Montgomery	-	-	0**	T.A.McGowan

- No previous record
* No report for 1955
** First run in 1955, new routes
*** Will be discontinued, not suitable habitat.

In Table 2 which follows we have tried to show in tabular form what the status is for the States concerned by comparing counts on the same routes for both years 1954 and 1955. New Routes are not counted this year but will be in next year's summarization for Table 2.

Table 2.--A comparison of woodcock counts for 1954 and 1955

State	1954 count	1955 count	Change
Delaware	11	9	-2
North Carolina	11	18	+7
New Jersey	17	15	-2
Ohio	77	73	-4
Pennsylvania	154	132	-22
West Virginia	41	31	-10
Kentucky	9	7	-2

The large number of routes being run in Pennsylvania are possible as Steve A. Liscinsky of the Wildlife Research Division of the Pennsylvania Game Commission is working on a Woodcock Management Project and has trained a number of persons to assist in making the counts.

From the data in Table 2 it can be seen that with the exception of North Carolina, where more birds were recorded than last year, all the other States reported fewer birds in 1955 than in 1954.

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WOODCOCK SINGING GROUND COUNTS IN THE CENTRAL-NORTHERN UNITED STATES-1955

John W. Aldrich

U. S. Fish and Wildlife Service, Washington, D. C.

Another very gratifying increase in number of routes run for woodcock singing ground counts in the Central Northern States took place in 1955. The increase in routes in Michigan, Wisconsin, and Minnesota combined was from 40 in 1954 to 65 in 1955. This represents increases in all three states, and is a substantial improvement in the coverage. It may be that Michigan with 52 routes now has a sufficient number to be a satisfactory sample of the breeding grounds of that state. This will not be known, however, until statistical analyses of the data have determined its variability in relation to various areas of woodcock density. Studies should now be conducted to determine what the existing routes do actually represent in terms of the over-all area in which woodcock breed and the varying densities of woodcock abundance in these areas.

In Table 1, data obtained on all routes run in 1955 have been tabulated. Also in this table all data obtained on these same routes in 1954 are presented for comparison if they were run in that year.

In Table 2, comparative totals are given for data obtained in both 1954 and 1955 for all routes run in each year and for just those which were run in both years. It is noted that by comparing the totals for all routes run in each year there was a 19.7% decrease from 1954 to 1955. However when totals for only routes run both years are compared the decrease was 17.5%. It would seem that the latter comparison would give a more reliable idea of actual change in woodcock populations, at least in the areas represented, since they were representative of the same areas of woodcock breeding habitat. What relation these had to the total area of woodcock breeding habitat is not known however. Presumably the 65 routes run this year would be more representative of the total woodcock breeding area than the much smaller number (30) run both years. But even this cannot be said with certainty without knowing what they actually do represent. It is hoped that cooperators will try to run exactly the same routes in successive years so that the maximum value can be obtained from the data and until the results can be analyzed for variability and it can be determined what they represent in terms of the over-all woodcock breeding area. Meanwhile we would like to encourage the establishment of new routes in areas not now represented at all, particularly in Wisconsin and Minnesota.

Acknowledgment should be made to the various State Game Departments and individuals listed in Table 1, who ran the routes, for excellent cooperation. Without their help, research of this sort, requiring a considerable amount of manpower distributed over wide areas, would not be possible.

Table 1.--Woodcock breeding ground counts in Central-Northern States-1955

Locality	Observer	Total No. trips	Total birds heard all trips	Total stops all trips	Av. No. birds per stop	1954 Av.No. birds per stop
MICHIGAN						
Alger Co. Stutts Creek	Louis J. Verme	3	29	33	.879	.879
Allegan Co. Manlius	C.E.Friley,Jr.	3	1	24	.042	.292
Baraga Co. L'Anse	R.R.Rafferty	2	23	16	1.438	
Baraga Co. Clear Creek	J.H.Pann	1	7	9	.778	
Barry Co. Yankee Springs	C. F. Storkan	3	19	30	.633	1.100
Cheboygan Co. Tin Bridge Rd.	L.H.Blankenship	2	19	18	1.056	
Chippewa Co. #1 Johnswood	L.G.Schemenauer G.A.Ammann	2	30	22	1.364	1.700
Chippewa Co. Beavertail	L.G.Schemenauer	2	16	18	.889	
Chippewa Co. #2 Sault Point	L.G.Schemenauer	2	9	14	.643	.526
Chippewa Co. #3 Dunbar	L.G.Schemenauer	2	8	16	.500	.500
Chippewa Co. Tilson Rd.	L.G.Schemenauer	2	7	14	.500	
Clinton-Shiawassee Co., Rose Lake	Bill Goudy	3	30	24	1.250	1.417
Clinton Co. Chandler Marsh	Aelred D. Geis	3	16	21	.762	1.714
Gladwin Co. Cedar River	A. Gene Gazlay	2	21	22	.955	1.303
Gratiot Co. #1 Gratiot-Saginaw	L.H.Blankenship	3	55	30	1.833	1.733
Gratiot Co. #2 Gratiot-Saginaw	L.H.Blankenship	1	9	9	1.000	
Houghton Co., Hopes Creek	R.R. Rafferty	2	12	14	.857	1.143
Huron Co. Colfax #1	Charlot Braden	1	20	9	2.223	1.519
Huron Co. Colfax #2	Charlot Braden	1	10	7	1.429	
Huron Co. Colfax #3	Charlot Braden	1	5	6	.833	
Ingham Co. Dansville #2	Dykema-Janson	1	4	8	.500	.190
Ingham Co. Dansville #3	D.W.Douglas	3	16	30	.533	.433

Table 1.--Woodcock breeding ground counts in Central-Northern States-1955 continued

Locality	Observer	Total No. trips	Total birds heard all trips	Total stops all trips	Av. No. birds per stop	1954 Av.No. birds per stop
MICHIGAN (continued)						
Iron Co. T43N-R31W	Ivan Thomson	3	30	30	1.000	.900
Isabella Co. Mt.Pleasant #1	Wm. Southern	1	22	15	1.467	
Isabella Co. Chippewa #1	Irene F. Jorae	1	14	9	1.556	
Isabella Co. Chippewa # 2	" " "	1	5	9	.556	
Isabella Co. Chippewa #3	" " "	1	12	11	1.091	
Isabella Co. Chippewa #4	" " "	1	7	10	.700	
Isabella Co. Chippewa #5	" " "	1	5	9	.556	
Kalamazoo Co. " #1	Gladys A. Hall and H.L. Potts, Jr.	3	28	45	.622	1.067
Kalamazoo Co. Alamo #2	Gladys A. Hall	3	21	36	.583	.900
Kalamazoo Co. Augusta	R. D. Van Deusen	3	27	30	.900	
Lake Co. #1 T17N, R12W	Philip Baumgras	1	10	8	1.250	1.875
Luce Co. McPhee's Landing	O. DeWaard	2	16	16	1.000	.875
Mackinac Co. Carp River #1	L.G.Schemenauer	2	18	22	.818	
Midland Co. Dow Corning Area	Bruce Winchell	1	11	7	1.571	1.857
Midland Co. #2 T16N,R2W	A.Gene Gazlay	1	7	9	.778	
Montmorency Co. Hunt Creek	L.H.Blankenship	1	8	8	1.000	
Newaygo Co. Bridgeton	Esther Roossinck	1	6	7	.857	2.444
Newaygo Co. T16N, R12W	Philip Baumgras	1	8	10	.800	
Oakland Co. #1 Orion	M.D.Ismond	3	33	18	1.833	
Oakland Co. Highland Area	Joseph Vogt	1	5	10	.500	
Ogemaw Co. Greenwood Road	Lawrence Ryel	2	21	18	1.167	1.481

Table 1.--Woodcock breeding ground counts in Central-Northern States-1955 continued

Locality	Observer	Total No. trips	Total birds heard all trips	Total stops all trips	Av. No. birds per stop	1954 Av.No. birds per stop
MICHIGAN (continued)						
Ontonagon Co. #1 N.Cemetery Rd.	Arthur Peters	1	6	6	1.000	.778
Ontonagon Co. Matchwood Twp.	Mrs. Lalide	3	21	12	1.750	
Otsego Co. Ford	Otto Failing	2	4	14	.286	.857
Otsego Co. Ford Lake Rd.	L. H.Blankenship	1	5	7	.714	
Roscommon Co. #1 T22N,R4#	W.L.Palmer	1	12	12	1.000	1.125
Roscommon Co.#2 Michelson	" " "	1	8	11	.727	1.091
Schoolcraft Co. Driggs R.	D.C.McGlauchlin	3	16	27	.593	
St. Joseph Co. #1 Fabious	James Linder	3	5	24	.208	
Van Buren Co. Almena	W. F. Freyburger Gladys A. Hall	3	42	45	.933	.967
MINNESOTA						
Aitkin Co. #1	W. H. Petraborg	2	0	21		
Aitkin Co. #2 Spencer	" " "	2	0	22		
Carlton Co. Cloquet	Wm. H. Marshall & Schwarzler	3	15	30	.500	
Cook Co. Bally Creek Rd.	Milton H. Stenlund	2	8	18	.444	.333
Koochiching Co. Black River	L. T. Magnus	1	2	7	.286	
Lake Co. Fernberg Rd.	M. H. Stenlund	1	6	9	.667	
Wabasha Co. #2 Watopa	Wm.H.Longley	1	1	7	.143	
Winona Co. #1 Whitewater Twp.	" " "	2	2	16	.125	.063
WISCONSIN						
Langlade Co. Ackley	F.D.Irving	1	8	13	.615	.641
Lincoln Co.	F.D.Irving & E.D.Morrison	1	10	12	.833	
Marathon Co.	"	1	7	8	.875	
Price Co. Fifield	A.D.Doll	2	2	18	.111	
Price Co.	" " "	1	8	11	.727	

Table 2--Woodcock breeding ground count summary, Central-Northern States - 1955

	Total routes	Total birds all trips	Total stops all trips	Av. No. birds per stop per trip
Michigan	52	799	889	.899
Wisconsin	5	35	62	.565
Minnesota	8	34	130	.262
TOTALS 1955	65	868	1081	.803
" 1954	40	1057	1057	1.000
Difference				-.197
Change				19.7% decrease

Total 1955 for routes run both years (30 reports)	.872
" 1954 " " " " " " "	1.057
Difference	-.185
Change	17.5% decrease

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MASSACHUSETTS WOODCOCK STUDIES - 1955

William G. Sheldon

Massachusetts Cooperative Wildlife Research Unit,
University of Massachusetts

Spring trapping and banding of breeding male woodcocks was conducted on a sharply reduced scale as compared with the previous five years. Although the trapping effort was less, former singing grounds which had yielded birds were carefully censused to ascertain whether birds were present.

Project efforts are being shifted from spring to summer. It is now planned to do no more spring trapping except on certain local areas with a high breeding density. Netting methods for summer captures have been much improved over former years.

Spring Activities

Results of banding.--Sixty-nine woodcocks were captured. Five of these were chicks from two broods and one was a female. There were 11 returns. Four of these had shifted singing grounds for distances ranging from 1/4 mile to 3/4 mile from original banding sites. Two of the returns were birds which had been netted during the summer of 1954. Only one bird at least 5 years old was recaptured. There were two repeats of birds recaptured on different singing grounds. Both birds had moved approximately a mile. None of the four 5-year birds captured in 1954 were recaptured.

A singing male woodcock, #523-07611, banded on Martha's Vineyard Island in April 1953, was picked up dead under a power line on the island in late February 1955. There are a number of reports of birds wintering on the Vineyard so there is no way of knowing whether this woodcock was a permanent resident or a returning migrant.

Populations in Quabbin Reservation.--In the Massachusetts study areas, there are three widely separated trapping grounds inside Quabbin Reservation. Two of these areas, Prescott Peninsula and Gate 40, have virtually been untouched since trapping started in 1950. Most of the open fields were planted to red and white pine. The red pine now dominates these plantations and growth has averaged almost 3 feet a year. Fringe covers of grey birch and aspen have also been growing rapidly. It was suspected two years ago that both areas, and especially Prescott Peninsula, were rapidly growing beyond optimum woodcock spring habitat. Details on some of the vegetative changes will comprise a separate study. Suffice it to say that there is little question that such changes have been responsible for a steadily dropping population in both areas. Lack of suitable singing sites does not appear to be an important limiting factor. It is a question of the changing condition of the entire woodcock habitat. A drop became noticeable in 1953. The number of occupied singing grounds on both areas, clearly illustrates the trend; these were: 1951 - 74; 1952 - 74; 1953 - 64; 1954 - 52; 1955 - 43. The drop in breeding birds is not interpreted as a fall in population in the state, but as a result of changing vegetation.

In contrast, the third trapping area in the reservation is open to the public. Picnic sites and scenic views from the highway have been developed by continual clearing. The highest woodcock breeding population in five years was found in 1955. There were unusual concentrations of singing males. From one spot on the highway, six singing males could be heard and all were trapped. Another large field covered by scattered alders and blueberry bushes contained at least 8 singing males; on one occasion a good observer reported he distinguished a minimum of 12. There were two new singing sites in areas where a forest edge had been recently cleared.

Annual census.--The annual census reported elsewhere indicated an overall drop of about 15 percent in Massachusetts. The principal drop occurred on Prescott Peninsula where there are four census routes.

Two additional routes outside Quabbin Reservation were run this spring, and it is planned to make census runs in widely separated parts of the state next spring.

Summer Activities

Banding.--Beginning on June 13, netting woodcocks during their summer crepuscular flights, reported in previous years, was continued intensively until September 16. Dr. William B. Nutting of the University Zoological Department assisted the project by searching for other netting areas and making observations on the behavior of birds.

New light Japanese mist nets were used with much greater success than the heavier nets used in former years. Less than one out of three birds hitting the heavy nets in 1953 and 1954 became entangled. With the new nets, approximately three out of four birds which hit the nets squarely were captured.

The nets were set on poles and when erected, covered a vertical distance of about 12 feet and a horizontal distance of 30 feet. They were left permanently in the field and were collapsed after each evening's operation.

A large majority of birds are captured from mid-June until the end of July. During the molting season, flights continue but are desultory. In August and September, only 22 birds were caught out of the total of 94 taken in nets during the summer. August and September captures were invaluable for studying the molt pattern, and most of these were preserved for study specimens. In addition to the 94 birds netted, 8 were captured in funnel traps set primarily for ruffed grouse.

It is of particular interest that during the three summers of netting on Prescott Peninsula (Area 1), when a total of 152 woodcocks were netted or caught in butterfly-shaped traps in adjoining gravel pits, there have been only two repeats. One bird caught in early September 1954 was recaptured two weeks later. In 1955, one juvenal male caught June 13 was recaptured two nights later. There is one other record of a repeat from Area 2 where a bird captured in mid-July was taken again two nights later.

Lack of repeats suggests that few birds visit the same area each evening. There are undoubtedly many crepuscular congregation fields which are regularly visited, but have not been discovered by Unit personnel.

There were considerably fewer birds observed in Area 1 in 1955 than during the two preceding years. Data presented elsewhere give evidence that the population on Area 1 has been steadily declining since 1952.

A number of records of either catching birds in the nets which were banded in the spring as adults or catching adult males in the spring which had been banded in the nets the preious year suggest that the netted birds come from various parts of Prescott Peninsula within a radius of at least two miles and apparently represent the breeding population of that area which returns year after year. The precise records are as follows: A female caught in a grouse clover leaf trap in the summer of 1953 was captured in the nets 3/4 of a mile away in August 1954. Two males captured in a grouse clover leaf trap in July 1953, were captured in the pits adjoining the nets two weeks later approximately a mile east of their original banding sites. Four males netted during the summer have been caught as singing males at scattered points on Prescott Peninsula the subsequent spring. Two males banded in the spring of 1955 were captured after mid-August in the nets during the summer of 1955.

Age and sex ratios.--The birds were aged by examination of the markings on the back feathers, a technique described by Allen J. Duvall of the Fish and Wildlife Service. Each bird was sexed, aged, weighed and banded. Two back feathers and the tip of one outer primary were taken from each bird to confirm sex and age during daylight.

By means of this technique, the age composition of the birds partaking in these evening flights was analyzed with extremely interesting results. The largest segment of the population was comprised of juvenal males. Adult and juvenal females made up the bulk of the remainder of the birds. Seventeen specimens sent to the Fish and Wildlife Service Collection in 1954 were aged. Eight birds netted in 1955 could not be sexed with certainty. Combining the results of 1954 with the 85 birds netted and aged in 1955, only 7 or slightly under 7 percent were adult males. Two of the adult males captured in 1955 were birds which had been banded as singing males during the spring. In contrast, 42 birds were identified as juvenal males comprising approximately 41 percent of the population. The breakdown by age for the 17 birds collected in 1954 and the 85 netted birds aged in 1955 is depicted in Table 1.

Table 1.--Age ratio of 102 Massachusetts woodcocks netted in summers of 1954 and 1955

Age	Sex	Number	Approximate percentage
Ad.	♂	7	7
Juv.	♂	42	42
Ad.	♀	28	27
Juv.	♀	25	24
Total			100

In addition to the 102 birds which could be aged, there were an additional 82 captured during the summers of 1953, 1954 and 1955 which were sexed. Most of these were netted, but a few were taken in blind butterfly-shaped traps or in cloverleaf funnel traps. Eight of these birds were caught in funnel traps in 1955 and aged. One was an adult male, a return on a bird caught in the spring; three were juvenal males; three were adult females; and one was a juvenal female.

The sex composition of all other summer-caught birds which were not aged was 50 males and 24 females or a sex ratio of 100 males to 48 females.

In considering sex ratio, it is difficult to be sure how to interpret the summer birds, due to the virtual absence of adult males. The sex composition of the known juveniles, which is 168 males to 100 females, is in great contrast to the sex ratio reported in the literature for fall-shot birds. However, the nature of these summer flights, to be discussed in more detail below, may well be such that the sex ratio of the juveniles does not give a true picture of the over-all woodcock population.

The adult hen-chick ratio is 1:2.4. Age studies of fall-shot woodcocks have indicated a slight preponderance of adults in the hunter's bag. If sex ratio is even, the summer figures would give an adult-chick ratio of 2:2.4. Since most of these data come from July captured birds, the indication is that the chick mortality rate exceeds the adult mortality rate from mid-summer until the opening of the hunting season.

Description of lighting areas.--The area where birds light in Prescott Peninsula (Area 1) is a small field about 1/4 acre in size with a ground cover of low bush blueberries, scattered sweet fern, and a few clumps of oak and chestnut sprouts. There are a few open areas between the bushes which are the favorite lighting places. It is the site of an old burn, and numerous dead logs and stumps litter the area. These provide an ideal habitat for ants and numerous beetle larvae. The area is surrounded by a predominant growth of grey birch up to 20 feet high. Oak sprout growth is the next most abundant woody plant. Scattered white pines up to 60 feet high are found at various distances back from the perimeter of the field. The ground is exceedingly dry and well drained. Within 100 yards are two old gravel pits which often contain moist or wet bottoms, and these are occasionally visited by the birds. The field was used by one singing male during the spring. He was captured and banded in April, but never netted during the summer.

Area 2 on the south side of Quabbin Reservoir is almost 2 acres in size. Part of it is an abandoned field with low bush blueberries and scattered white pines. The favorite lighting area is a bare area of about an acre. Several years ago machines scraped all the topsoil off the area. Vegetation is sparse and the soil rocky. Numerous ant holes are scattered in the area, but the habitat is not nearly as favorable for insect life as Area 1. The fringe of the area on one side is a red

pine plantation and on the other, low grey birches and scattered hardwoods. The border growth on the whole is higher than that on Area 1. There was a high breeding population near this area and 6 singing males could be heard from one spot. All were captured and banded in the spring of 1955, but none of these was netted.

Area 3 on the south side of Quabbin Reservoir is an abandoned field of several acres in extent. It is filled with scattered clumps of high bush blueberries. Being open to the public, there were well beaten paths around all the blueberry bushes in July. These relatively clean bottom paths at the base of the bushes were the favorite lighting spots during the evening flight of woodcocks. The birds flew from neighboring woods and were seen on occasion to come from at least 300 yards away. There was a minimum of 8 singing males on this area in the spring. This field was not netted because of insufficient nets and possible disturbance by the public.

Description of flights and behavior of birds.--The general pattern of the flights was the same in all three areas. The light intensity which prompts the beginning of singing earlier in the year is the same intensity causing the beginning of woodcock activity during the summer months. From the time the first bird is seen over the lighting field, all activity takes place for the next 10 or 15 minutes. It ceases very suddenly. Because of the relatively brief duration of the flying period, a bird or two is usually lost when it hits one net and becomes briefly entangled because of the operator's preoccupation with disentangling another bird. It is not unusual to have two birds hit the same net almost simultaneously. The birds frequently fly by or into the field in groups of two or even three. There was no evidence that broods maintained their identity. Some evenings as many as 35 birds were seen or heard.

The most conspicuous behavior characteristics from mid-June until late July is a "semi-courtship" flight performed by the juvenal male birds. Many of the latter perform the typical circular wing twittering flight rising in spiral flights as do the adult males in the spring. Their descent is also typical of the spring singing male bird, but the musical "chirp" note is never given. It is mostly assumption that these birds are juveniles since practically no adult males are captured. In one instance, a bird descending from one of these half-hearted "courtship" flights came directly into a net and proved to be a juvenal bird.

There is no indication of sexual development in the testes of these birds. All such "courtship" activity ceases by the end of July or very early August. During the evening of July 13, William B. Nutting observed such semi-courtship behavior of an apparent male and female on the lighting field.

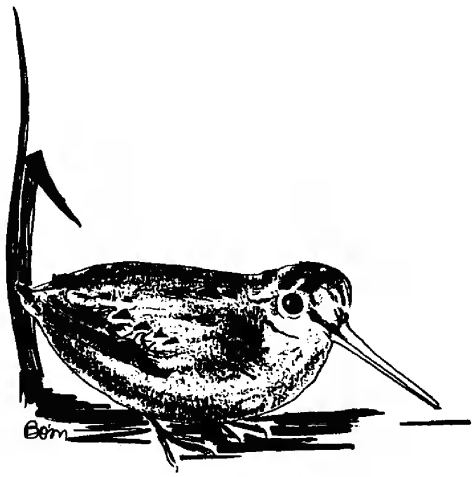
One evening E. Howard, Jr., watched what was taken to be a female woodcock on the lighting field. She walked around in small circles deliberately smoothing a place in the grass not unlike the behavior of a domestic setting hen.

Besides these activities, birds on several occasions have been observed feeding on these lighting fields. The 1954 report gave a positive record of eating ants. Two birds were collected in 1955 after they had been in the field for 10 minutes. Stomach contents of these birds and others will be analyzed during the winter. Cursory examination of the stomach contents of several specimens indicates a surprising number of such items as the Diptera and Coleoptera larvae, centipedes and caterpillars. It is suspected that during the dry summer months many woodcocks may not be as dependent on earthworms as many believe. Few midsummer stomach analyses have ever been made.

Molts.--In cooperation with Dr. L. R. Bartlett of the University Zoological Department, 21 woodcocks were collected in late summer primarily for an anatomical study to be conducted by an honors student in the Zoology Department. Dr. Bartlett has made careful notes on the molting pattern of all these birds. Two males of known age (adults) were netted, and it was noticed that the first three primaries were in full molt. Juveniles were captured in various stages of molt, but the evidence to date suggests juveniles do not molt their primaries until the second year. Careful study of the wings of fall specimens may thus reveal a clue to determine age.

Weights.--There is a great deal of overlap in the weights of juveniles and adults. Seventeen adult females averaged 184.5 grams ranging from 159 to 212 grams. Fifteen juvenal females averaged 173.3 grams ranging from 151-191 grams. There were four adult females weighing more than 191 grams. Twenty-six juvenal males averaged 140.8 grams ranging from 127 grams to 154 grams. The only adult male weighed was 135 grams.

Parasites.--Two species of hippoboscid flies were identified from woodcocks taken in the vicinity of Amherst. A short joint paper by the investigator and Dr. F. R. Shaw of the University Department of Entomology, has been submitted for publication to the Journal of Economic Entomology describing these ectoparasites.



COVER REQUIREMENTS OF BREEDING WOODCOCK IN CENTRAL MAINE*

Robert B. Weeden

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The ecology and behavior of breeding woodcock in central Maine were studied for the purpose of obtaining information which would be of value for future environmental management of this species. Singing grounds, daytime resting and feeding covers, nesting and brood covers were located for purpose of determining cover preferences of woodcock and the relationships between the various portions of the breeding areas. To obtain data on movements adult birds were captured, marked, and released. Breeding populations were determined by means of annual censuses of the males. The following conclusions were drawn from this study:

1. Breeding woodcock, in general, require young, open hardwood or mixed hardwood-conifer growth in which to carry on their spring and summer activities. On the Greenbush area, grey birch and alder stands are most often used for diurnal, nesting, and brood covers. Conifers, particularly young spruce, balsam fir, and larch, make up an average of 10 to 20 percent of the entire stand in all breeding covers. Areas receiving greatest usage are those which are moist and which have moderately thin ground cover.

2. It was observed that woodcock exhibit strongest territorial behavior on the singing grounds. Diurnal covers are usually established and maintained by one adult male although on several occasions two birds were flushed from one cover. Nesting sites and brood covers are not actively defended although there is probably some tendency toward isolation during the nesting and post-nesting seasons.

3. Most diurnal, nest, and brood covers are within 100 yards of a singing ground. The average distance between various portions of the breeding covers are as follows: (1) Between two singing grounds, 65 yards; (2) from singing ground to nest, 75 yards; (3) from nest to diurnal cover, 70 yards; and (4) from singing ground to nearest diurnal cover, 120 yards. Brood covers are not easily located after the young are over three days old, but are probably close to the nest site.

4. One female, marked for identification, was captured

*Summary of a thesis for the degree of Master of Science at the University of Maine.

in a trap placed on a singing ground and was later found on a nest three-quarters of a mile away. The nest was only 50 yards from the singing ground of another male bird. This observation indicates that females may not nest near the singing ground of the male with which they mate, or that female woodcock visit more than one singing ground prior to nesting.

5. Alder covers, which are of considerable importance to woodcock, have a very short period of usefulness. All alder stands used by woodcock at Greenbush average from seven to nine years of age; unused stands average 10 to 12 years. Alder is a short-lived species, probably not surviving more than 20 years under favorable soil conditions. However, since most alder covers are of uneven age, they are probably used by woodcock for approximately seven or eight years.

6. In connection with the study of woodcock activities, a device for recording the movements of nesting females was constructed. This device is inexpensive, easy to build and maintain, and has no electrically activated parts. With some modifications in construction and use, such a recorder should be of value in many studies of nesting birds.

7. Future management of the Greenbush area for improved woodcock usage should include (1) heavy thinning of existing overmature alder stands; (2) annual grazing of some alder and birch-alder stands; (3) the establishment of new singing grounds in areas of dense mixed growth; (4) the cutting of bushes and trees on several of the singing grounds now in use.

THE JUVENAL PLUMAGE OF THE AMERICAN WOODCOCK

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In a study of the possible variation in populations of the Am. Woodcock (Philohela minor) from various segments of its breeding range, one of the primary requisites has been to be able to differentiate immature from adult birds. Use of various measurements such as wing and bill lengths are dependent upon proper ageing or sexing of the samples. It is known that in certain species such as the Redwing (Agelaius phoeniceus) first year birds have decidedly shorter wings than adults (Howell and van Rossem, 1928). Any comparison of measurements, therefore, should consider the age factor when it is possible to determine this. It is especially important when comparisons are made of fall specimens when immature birds would be present in most samples. The present study was made with specimens in the National collections in Washington, supplemented by material borrowed from many museums and universities. The writer is especially indebted to William Sheldon, Howard Mendall, Bruce Wright, Vincent Reid, and Leslie Glasgow, who had specimens collected for the study.

In attempting to separate juvenal from adult woodcock specimens no difficulty was experienced in separating juvenal birds which were obviously not full grown. At first, however, many birds taken in June, July and August could not be satisfactorily classified as to age, even though bill measurements were as large as 70-73 millimeters which is about the average for adult females. It may be noted in passing that the collectors have had the same difficulty as indicated by a number of summer specimens in the collection being labeled "adult" and which proved later to be actually in juvenal plumage. A perusal of the literature of the more important American bird publications offered little help since most stated that the juvenal plumage was similar to the adult, but softer and looser in textures. We now know that this difference, if discernible at all, is not the most obvious difference. Even at this writing there is no certainty as to the actual sequence of moult from the juvenal to adult or nuptial plumage. Ridgway,(1919:156) even omitted description of the juvenal plumage. The best account of this plumage, although incomplete, is that by Pettingill (1936:194) in which he gave the clue needed to positively classify birds as juveniles before the completion of the post-juvenal moult. This author states that in the juvenal plumage the black-centered feathers of the back, scapulars and some of the secondaries [tertials] have a conspicuous and even terminal border of "light pinkish cinnamon," and that in the adult plumage these terminal borders are not pronounced and in the majority of cases do not occur. Although adequately illustrating the feather pattern of certain juvenal feathers, the manner in which these were compared with corresponding adult feathers does not clearly indicate the marked difference.

In the juvenal plumage, the back, scapulars and tertials have a large subterminal area of black with a light-colored border varying from white to buff. The comparable feathers in the adult have a black basal area, followed distally by a grayish or cinnamon bar, followed by a narrow irregular subterminal black bar and terminate in a light border varying from gray to cinnamon. The differences between the juvenal and the adult feather patterns are illustrated in Figures 1 to 5. In addition to the above-mentioned difference, the indistinct barring of the juvenal wing coverts as contrasted with the distinct barring in equivalent adult feathers is brought out in Figure 5. Depending upon the degree of wear during mid-winter and spring, the edges of the adult feathers of the upper parts are frequently lost, and often only traces of even the subterminal black bar remains. In effect, the pattern appears superficially much like the juvenal patterns. In cases like this the placing of a white card under an individual feather aids observation sufficiently to discern the characteristics of pattern. To summarize the difference briefly, the basic diagnostic pattern of certain feathers on the upper parts of juvenal woodcock are black, tipped with light while in the adult the pattern is more complex, starting basally with black, followed successively toward the tip by a light bar, a narrow irregular black bar and finally a light edging.

The above age characters were determined from specimens, the ages of which had been determined through banding, by juveniles which still had some of the natal down present, and by adults known to have been breeding when collected. As an added verification, sketches of feathers were furnished to William G. Sheldon, Leader of the Massachusetts Cooperative Wildlife Research Unit, who checked the differences during his field studies of woodcock in Massachusetts. Sheldon (letter, July 5, 1955) also furnished additional evidence:-"If any additional evidence is necessary, it might be of interest to you that three birds, with the juvenile feather pattern characteristics, 'peeped' when captured. This note was typical of what one hears in young birds which have not yet attained the power of flight. To date, there has been no difficulty distinguishing ages of the birds captured."

Since the woodcock begins nesting earlier than most American species, and growth is very rapid, there is only a relatively short time in which the juvenal plumage is present or recognizable. Studies at present are inconclusive as to plumage separation of birds once the post-juvenal moult is completed. There is question also whether the moult is partial or complete (Pettingill, 1936). If the post-juvenal moult is partial and certain feathers such as primaries, secondaries and rectrices are retained, further studies might reveal plumage characters by which birds of the year can be recognized in the fall and winter. An important adjunct to such studies would be specimens banded as juveniles, and subsequently recaptured during and after the post-juvenal moult. At present the only promising method of age determination by external examination is by cloacal examination (Greeley, 1953).

Figure 1

a b

ADULT TERTIALS

a. Fresh post-nuptial plumage

b. Worn nuptial plumage

Figure 2

a b

JUVENAL TERTIALS

Figure 3

a b

ADULT SCAPULARS

a. Fresh post-nuptial plumage

b. Worn nuptial plumage

Figure 4

a b

JUVENAL BACK FEATHERS

a. Scapular

b. Middle of back

Figure 5

a b

MEDIAN WING COVERTS

a. Adult

b. Juvenal

B.O.M.

Greeley also points out that combined sex and age ratios of fall-shot woodcock have not been published because of the uncertain methods of recognizing birds of the year. Although bill length has been the best character for determining the sex by external examination it was pointed out by Greeley (loc.cit.) that the width of the outer primaries (3) in the female woodcock are noticeably greater than in the male. Although admitting that such a sex difference was present, Westfall (1954) concluded that Greeley's method of sexing woodcock was not practical for use by field biologists because of the great variation in measurements exhibited by different individuals. However, statistical tests made by Westfall indicate that there is a valid sex difference in size as first pointed out by Greeley. It would seem that a fixed measurement device or tool could be devised which would be useful if used consistently by technicians. This would avoid uncertainties resulting from different techniques.

Greeley, Frederick 1953. Sex and age studies in fall-shot woodcock (Philohela minor) from southern Wisconsin. Journ. Wildl. Mgmt., 17(1):29-32. Jan.1953.

Howell, Arthur H. and van Rossem, A. J. 1928. A study of the Red-winged Blackbirds of southeastern United States. Auk, 45(2):155-163.

Mendall, Howard L. and Aldous, Clarence M. 1943. The Ecology and Management of the American Woodcock. Maine Coop. Wildl. Res. Unit, Univ.of Maine,Crono, Me., 201 pp.

Pettingill, Clin Sewall, Jr. 1936. The American Woodcock, Philohela minor (Gmelin). Memoirs of the Boston Soc. of Nat. Hist. 9(2):169-391; pl.12-21; fig.1-7.

Ridgway, Robert 1919. The Birds of North and Middle America. Bull. 50, U. S. National Museum, part 8; 852 pp.

Westfall, Claude Z. 1954. A study of woodcock behavior on their breeding grounds in central Maine. 117 pp. (Unpublished Masters Thesis, Univ. of Maine, Orono, Me., June 1954).

WILSON'S SNIPE WINTERING GROUND STUDIES, 1954-55

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U. S. Fish and Wildlife Service, Laurel, Maryland

The investigations of the winter of 1954-55 included (1): The fourth annual mid-winter Abundance Index of the Wilson's Snipe conducted in 18 southern states; (2) an analysis of the annual Christmas Bird Counts from snipe areas; (3) testing random ground transects as a method of measuring snipe abundance on the wintering ground; and (4) testing the feasibility of making snipe counts by aerial transects.

Wilson's Snipe Abundance Index

Map 1 shows the distribution of this winter's counts, with approximate abundance expressed in terms of the number of snipe recorded per hour. If coverage of an area was made in part or in whole on foot, the foot coverage figure was taken for purposes of this map. If there was no foot coverage, boat coverage data (if any) were used. If all coverage was by car, that figure was taken.

Table 1, patterned after a similar table from last year, depicts the number of snipe per hour for each of the past two years in each state, based on foot coverage alone. The left half of the table includes only those areas which were covered both years. The right half includes as well those areas which were visited one year but not the other. The figures on the left half, being from the same areas both years, would be expected to give a more reliable indication of relative population, though the total number of areas covered is considerably smaller.

Many of the areas which were run for the first time in 1954 were covered again in 1955, giving us 25 more areas with 2-year coverage than we had in 1954. In spite of this increase in coverage, results were quite variable, showing that even better participation will be required if we are to measure with any degree of accuracy the changes we hope to detect. Only four states are represented in Table 1 by more than five areas each.

Although the figures indicate a decrease of approximately 30 percent from 1954 to 1955, this drop is due primarily to reductions in a few large concentration areas. Of the 150 areas where comments were given as to changes in abundance from the previous year, 45 showed an increase, 43 indicated a decrease, and 62 reported no change of more than 25 percent.

In Louisiana, where the total count (snipe per hour) for 31 areas showed a decrease of 29 percent, the number of areas reporting decreases (14) was only two greater than the number with increases (12).

MAP NO. 1

DISTRIBUTION OF WINTER SNIPE COUNT

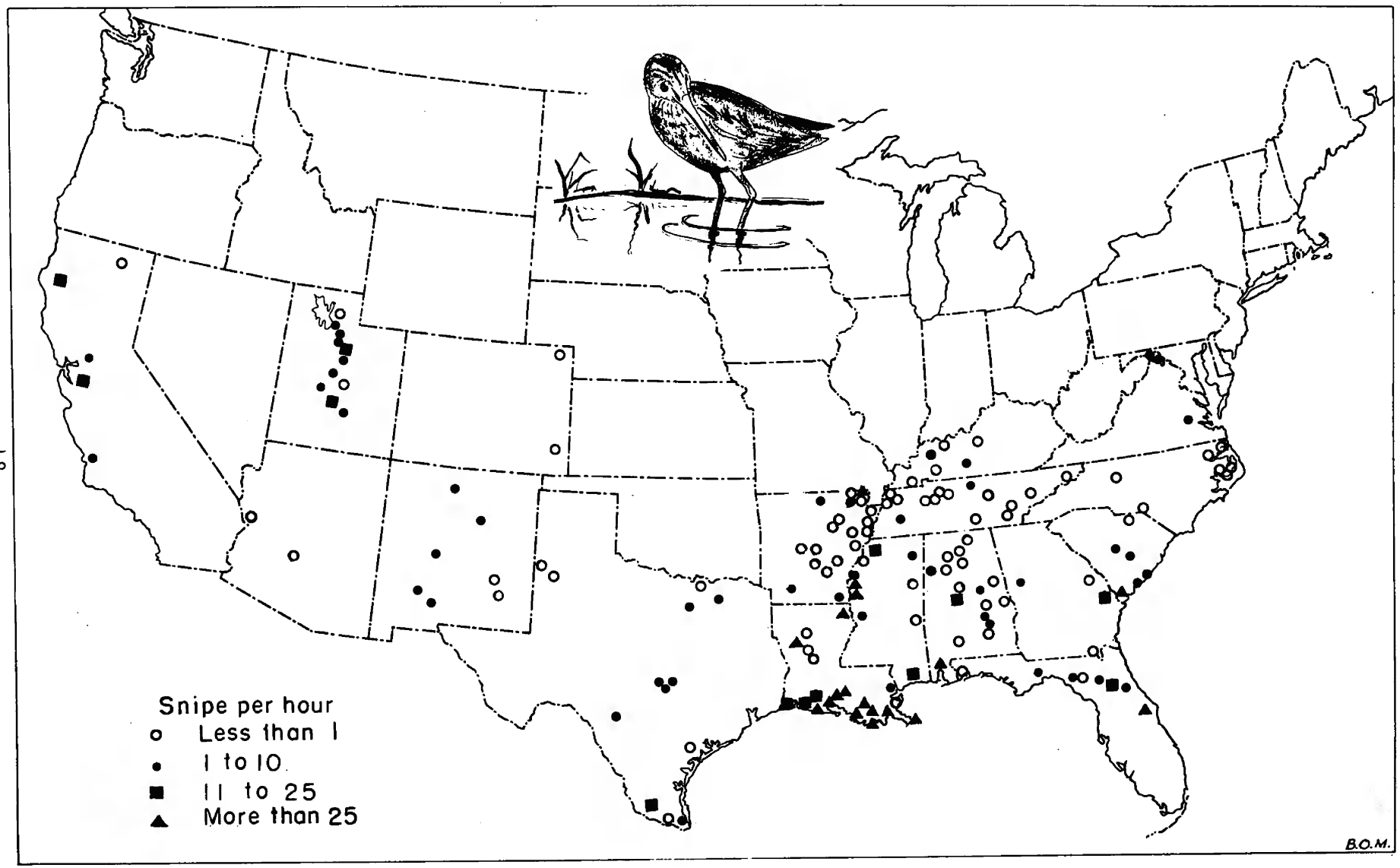


Table 1.--Winter Snipe Count - 2-year comparison based on coverage by foot only

State	Areas covered both years: Number of areas	Snipe per hour 1954	Snipe per hour 1955	Additional areas	All areas: Snipe per hour 1954	All areas: Snipe per hour 1955
California	4	20.8	7.9	6	35.5	7.9
Arizona	0	----	---	3	0.2	0.6
Colorado	0	----	---	2	3.4	0.0
New Mexico	5	0.7	1.2	6	0.6	1.4
Texas	1	0.0	0.0	19	15.2	2.4
Utah	7	2.3	5.4	5	1.7	5.0
Total, Region II	13	1.2	2.6	35	7.5	2.6
Percent change, Region II			+117%			-65%
Alabama	5	5.7	0.8	8	2.2	2.4
Arkansas	4	0.3	0.9	11	2.5	5.7
Florida	6	108.3	34.9	9	45.5	34.9
Georgia	2	19.7	15.5	2	9.9	12.4
Kentucky	3	0.3	0.4	5	0.2	0.8
Louisiana	31	75.3	43.6	4	70.7	41.0
Mississippi	5	83.3	60.8	2	83.3	58.7
North Carolina	3	0.3	2.2	14	0.2	1.3
South Carolina	5	11.1	12.8	1	11.1	11.6
Tennessee	8	0.0	0.0	6	0.0	0.6
Virginia	1	2.3	2.0	0	2.3	2.0
Total, Region IV	73	21.9	15.5	62	13.8	12.1
Percent change, Region IV			-29%			-12%
West Virginia	2	4.4	7.5	0	4.4	7.5
TOTAL	92	16.4	11.7	103	13.6	9.5
Percent change			-29%			-30%

Data from Christmas Season Counts

Table 2 shows a summary of the number of snipe recorded per 100 party-hours of field observation on the annual Christmas Bird Counts sponsored by the National Audubon Society and other organizations. All areas which have been covered in each of the past five years and which recorded the snipe in one or more of these years are included in the table. The areas are grouped by administrative regions to facilitate comparisons with the figures obtained on the January Abundance Index.

A single count of 1000 birds in 1953-54 in central Orange County, Calif., where no concentration had been reported in prior years and where only one snipe was found in 1954-55, makes it impractical to arrive at a fair comparison for changes of abundance in California this year. The total change indicated for Regions 2, 3, 4, and 5 is a decrease of 10 percent. Of the 183 areas that reported in both 1953-54 and 1954-55, 62 ahowed an increase, 77 a decrease, and 43 no change of more than 25 percent in either direction.

In summary, both the January Abundance Index and the Christmas Season counts show small declines from the previous year, both in total number of birds observed per unit time in the field, and in number of areas reporting changes in abundance.

Table 2.--Data from Christmas-season counts

Region		Number of areas	Snipe per 100 party-hours					
			1950-1951	1951-1952	1952-1953	1953-1954	1954-1955	5-year aver.
I	Wash., Mont., Oreg., Calif.	15	11	18	8	131	8	33.7
II	Wyom., Utah, Colo., N.Mex., Kans., Okla., Tex.	21	31	40	9	35	26	28.2
III	Minn., Wis., Mich., Ill., Ind., Ohio, Mo.	18	4	4	5	4	3	4.0
IV	La., Ky., Tenn., Miss., Ala., Va., N.C., S.C., Ga., Fla.	43	22	34	12	20	22	22.0
V	Mass., R.I., Conn., N.Y., N.J., Pa., Del., Md., D.C., W. Va.	35	3	2	14	10	8	7.4
	Total, Regions 2-5		13.0	16.5	11.6	16.2	14.6	14.4
	Grand Total	132	12.6	16.7	11.0	30.9	13.6	17.0
Change from previous year:	All areas			+33	-34	+164	-56 (includes great decrease in one area)	
	Regions 2-5			+27	-30	+ 40	-10	

Random Ground Transects

One of the main fallacies in our present method of conducting the January Abundance Index is that the majority of areas covered include optimum wintering habitat and there is insufficient information from large areas of low abundance. Observers who are asked to make a count in a certain part of the country naturally select the area where they can record the largest number of birds with the minimum amount of effort. On the other hand, if all areas were selected on a purely random basis it would require a big increase in personnel and expense.

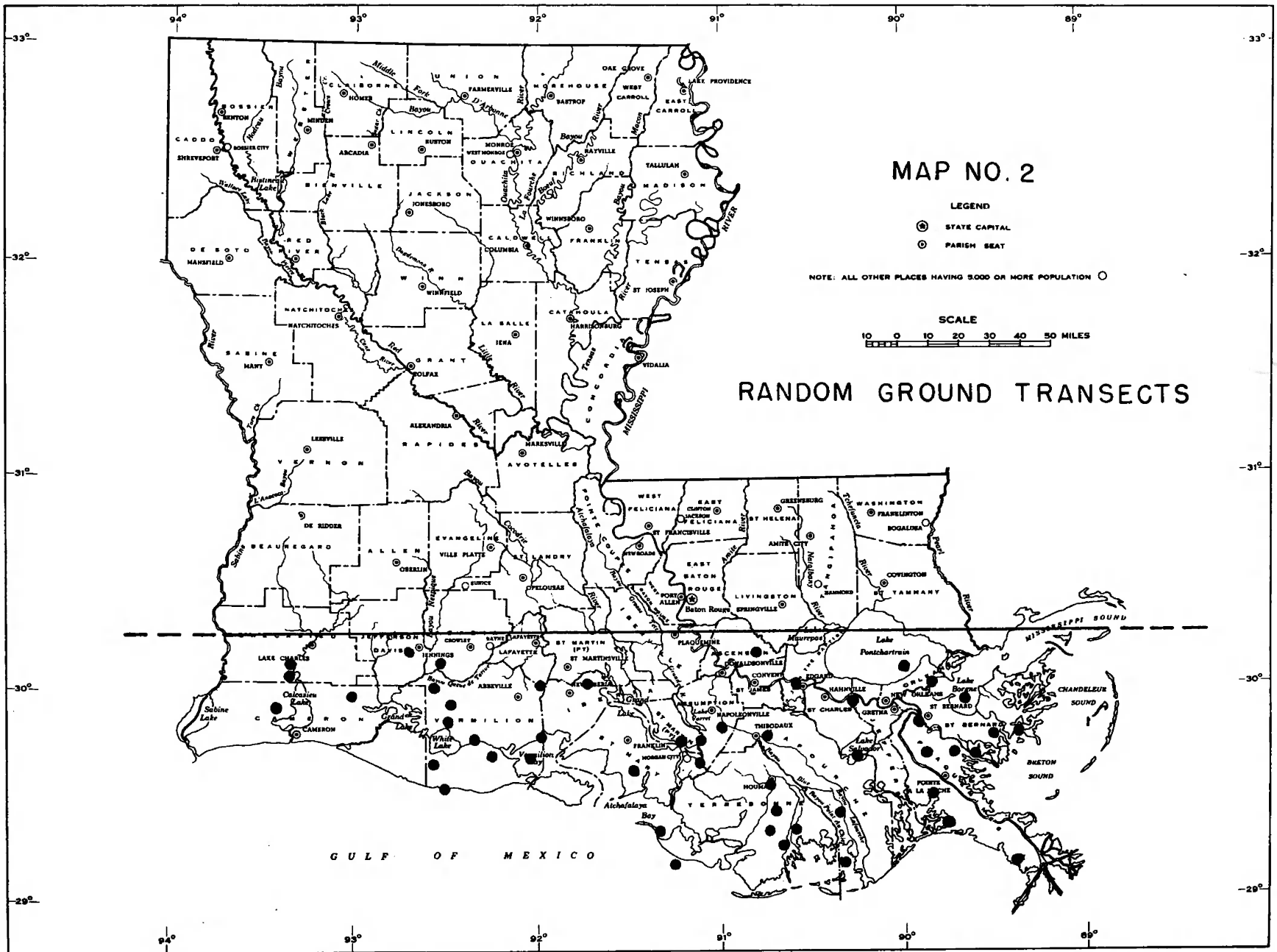
In order to test the practicability of random transects in those parts of the wintering range where the snipe population is relatively widespread, 50 5-minute intersections of latitude and longitude in southern Louisiana (south of 30° 15' n. lat.) were selected by a random drawing. Each spot was then marked on a topographic map, and a 20-mile route was laid out starting at the nearest road (if there was a road within 5 miles) and running as closely as possible in a northerly direction. If no road to the north was available, or if part of the road to the north was already included in another transect, an east or west road was selected.

Map 2 shows the locations of the starting points of the 50 random transects. Eighteen of these routes could not be covered for lack of roads. Four others were not covered for other reasons. The remaining 28 routes were run between January 26 and February 16. Some routes ran through excellent snipe country, while others included little or no suitable habitat. In some cases the routes had to be laid out along main highways, but in most instances they were along little-used roads. In a few cases last minute changes in routes had to be made because of flooded highways or a missing bridge; but all necessary detours were laid out on an arbitrary basis, taking the road most closely approximating the original route.

Results of the random ground transects may be summarized as follows:

	Total	Mean
Dates: Jan. 26-29, Feb. 10-16		
Number of routes covered:	28	
Length of each route	20 miles	
Total time afield (transportation to and from the route excluded:	32.6 hrs.	70 minutes
Time on foot	365 minutes	20 "
Number of stops	173	6.2
No. of stops with snipe recorded	28	1.0
Percentage of stops with snipe	16.2	
Total number of snipe	683	24.4
No. of snipe per stop	3.95	
No. of snipe per hour afield	21.0	
No. of snipe per hour on foot	112	

LOUISIANA


MAP NO. 2
LEGEND
STATE CAPITAL
PARISH SEAT
NOTE: ALL OTHER PLACES HAVING 5,000 OR MORE POPULATION
SCALE
10 0 10 20 30 40 50 MILES
RANDOM GROUND TRANSECTS
GULF OF MEXICO
94°
93°
92°
91°
90°
89°
33°
32°
31°
30°
29°

During the January Abundance Index counts I covered 6 areas in southern Louisiana and recorded 1167 snipe in 10.51 hours on foot. This is an average of 111 snipe per hour. The random transects gave almost exactly the same figure, 112 snipe per hour afoot. Since many of the random routes were taken in mid-February, it is likely that the population had been swelled by migrants from farther south. Nevertheless, the fact that the random transect figure is so high (2.7 times as high as the Abundance Index figure for all of Louisiana) suggests that it would be practical to put this method into operation in parts of some states.

With more intensive coverage it should be possible to obtain rough estimates of the total population, although important biases (such as the fact that all these transects run along roads) may always be present.

Air Transects

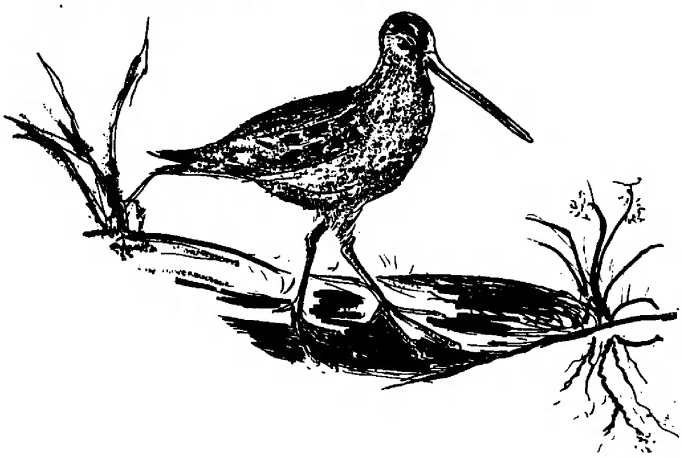
During the first half of February, Game Management Pilot Biologist John J. Lynch took me on 9 flights through the rice, cane and marsh country of southwest Louisiana. After some preliminary orientation flights we selected three transects and devoted most of the subsequent coverage to these. All flights were made in a Piper Cub at an air speed of 85 m.p.h. and a height of from 70 to 120 feet above the ground. Transects were made during all daylight hours except late afternoon, and under a variety of conditions of temperature, wind and sky cover.

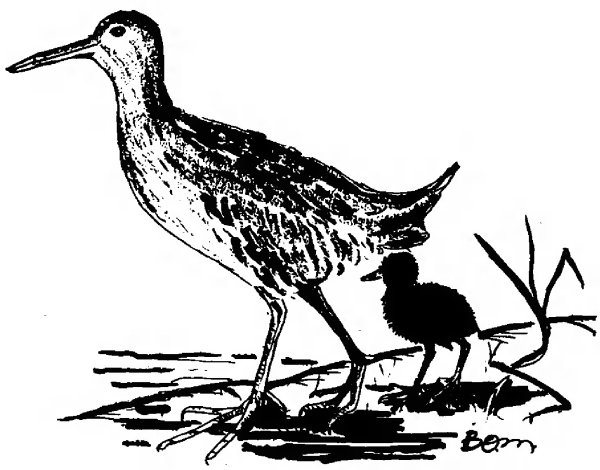
Considerable variability was encountered during successive trips over the same transect. This was due in part to poor weather conditions and in part to changes in the bird population of the transect. Data obtained from these first few flights are insufficient to permit an accurate appraisal of the air transect method, but indications are that sufficient snipe can be flushed (under suitable weather conditions) to obtain a reliable index to the population.

All of the following conditions should be avoided, as they seriously reduce the number of snipe recorded by plane: (1) Overcast skies; (2) winds in excess of 15 m.p.h.; (3) freezing temperatures or frozen ground; and (4) late afternoon or pre-sunrise coverage.

A 70-mile transect from Broussard to Lake Charles was covered 8 times, with from 1 to 85 snipe recorded per trip. The average number of snipe for all 8 trips was 23 birds. By omitting two trips made during freezing weather and two others made under overcast skies, the average was raised to 42 snipe per trip, or a little more than one bird for each two miles. These transects were run primarily through rice country and nearly all of the birds flushed came from a strip 300 feet wide directly under the plane. Not more than one snipe was identified on the ground; the birds must be flushed to be seen.

A total of 246 snipe were counted in 538 minutes of flying along the three different transects, or an average of 27.4 snipe per hour. Fifty-nine percent of the snipe recorded were seen by Lynch, and 41 percent by Robbins who sat in the back seat. Any observer or pilot-observer who is to participate in aerial snipe transects must have at least two or three hours of training flights to become familiar with the spotting and identification of snipe from the air. The birds are seen for so few seconds and frequently at such poor angles and in such poor light that they are difficult to identify. Air transects should preferably be made during January and the first week of February, as there is a decided influx of other shore birds into the rice fields after this date.





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